GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

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Editorial Notes.

A Step Forward.

An important step forward was marked by the issue, towards the end of last week, of the second report of the National Fuel and Power Committee. So important is the step, that it must cause a feeling of satisfaction throughout the gas industry. In view of the terms of the report, it is impossible to be otherwise than hopeful with regard to the future. Under the Chairmanship of Lord Melchett, and including among the members Sir David Milne-Watson and Sir Arthur Duckham, the National Fuel and Power Committee were appointed in August, 1926, "to consider and advise upon questions connected with the economic use of fuels and their conversion into various forms of energy, having regard to national and industrial requirements, and in the light of technical developments." Almost a year later, Sir Philip Cunliffe-Lister (the President of the Board of Trade) referred to the Committee for report a memorandum prepared by the National Gas Council—which was reproduced *in extenso* in the "JOURNAL" at the time—relating to amendments of existing gas legislation; and another memorandum, prepared by the Board of Trade, outlining additional proposals. These documents were referred by the Committee to a Sub-Committee of the members, under the Chairmanship of Mr. Frank Hodges, and with Sir Arthur Duckham as one of the members; and it is the Sub-Committee's report, together with the two memoranda just alluded to, which is now published as the second report of the Committee. The Committee themselves said to the President of the Board of Trade simply: "We are "all in substantial agreement with our Sub-Committee on "this subject." This is a short statement, but a highly significant one, when all that it means is realized.

There are four main headings under which the proposals are grouped—namely, simplifying the procedure under which statutory gas undertakers obtain their powers, and so facilitating the working; extending the operation of the thermal system of charging for gas, and imposing on all gas undertakers (whether statutory or not) a standard of purity and pressure; conferring statutory powers upon certain of the larger non-statutory gas undertakers; and amending in some respects the Gas Regulation Act, and other General Acts, so as to render them suitable to present-day requirements. The first heading presages the removal of the costly and cumbersome methods which have so handicapped gas undertakings in the past. The facilities with regard to such matters as the raising of capital and the making of arrangements for joint working between neighbouring undertakers, for which the National Gas Council have, with great ability, and with equally great energy, been pressing, are fully endorsed, subject to certain safeguards which are recommended. Greater borrowing powers than the customary one-half of the paid-up capital are foreshadowed; and the principle of the minimum dividend is regarded as necessary to secure the confidence of investors and to protect shareholders. Further, no objection is seen to an extension of powers to enable the Board of Trade to grant, by Departmental Order, where they are desired, basic price and basic dividend provisions; and the opinion is expressed that the two-part tariff system of charge is calculated to lead to more advantageous working, and is in the long run the fairest method of charge. These, together with the authorization of joint working arrangements and the power to confer statutory powers upon non-statutory undertakings, are only some of the matters in connection with which an alternative method of procedure to that under section 10 of the Gas Regulation Act is recommended—the alternative method being by means of a Departmental Order.

Beyond these suggestions put forward by the National Gas Council, there are the proposals of the Board of Trade relating to the extension of the thermal system of charging for gas and the conferring of statutory powers upon certain non-statutory undertakings. Some of the matters already referred to will necessitate amendment of the Gas Regulation Act; and having considered the representations of the National Gas Council, the Committee agree that opportunity should be taken to amend also other sections. The Gas-Works Clauses Acts, &c., will need some amendment, too; and, in this connection, the Committee express themselves as in agreement with a suggestion by the Board of Trade that undertakers should be required, when collecting money from prepayment meters, to supply consumers with particulars of the amount extracted, a statement of the meter reading, and also one as to the price which is being charged for the gas, as distinct from the additional charge for collection, hire of fittings, &c.

There can be no attempt here even to indicate all the more important points in the report. The document will be carefully studied by everyone associated with the gas industry; and the more thorough this study, the more favourable will be the judgment. The report constitutes an invaluable endorsement of the claims which have been so long and so persistently urged on behalf of the gas industry. With such recognition, we can push on cheerfully, looking forward with confidence to an era of yet greater usefulness and of increased prosperity.

Waterless Holders.

THE waterless holder has not shared the fate which customarily befals inventions; for though it originated only twelve years ago, there are to-day no fewer than 169 holders of this type either in use or on order. Nor can they be thought of as trial holders. The "JOURNAL" for Jan. 2, in which was published an illustrated description of a 20-million waterless holder erected in Chicago, bears witness to the fact that engineers of experience have accepted the design as a reliable proposition; and it is to the credit of gasholder makers in Great Britain that the plant for its manufacture in this country is thoroughly satisfactory and up-to-date.

As our readers are aware, it is only comparatively recently that the new design was favoured in this country; the Ipswich Gas Company being the pioneer. Of course, due caution and the exercise of forethought regarding a structure of such importance—from the points of view both of safety and of capital outlay—were to be commended; and it must not be inferred that the waterless holder should supersede all other types. Yet, in spite of the innate conservatism of British engineers, and bearing in mind that holders are not erected every day, it is highly significant that at the present time there are twelve waterless holders either in use or on order in this country. Germany, the birthplace of the invention, not unnaturally leads the field; the United States comes second; and Great Britain is an easy third.

An analysis of the number of waterless holders either in use or on order in the different countries of the world is contained in a paper which Mr. W. Rogers, the General Manager of Messrs. Cockey & Son, Ltd., presented to a meeting of the Western Junior Gas Association on Jan. 5 last, and which is published in full in our issue to-day. The paper is one of remarkable interest in that the method of erection of a waterless holder is detailed, step by step, from the laying of the foundations to the building-up of the final ring of the shell. Without doubt our readers will be greatly impressed by the extraordinary degree of accuracy which characterizes both manufacture and erection of this type of holder. Everything is jig or tinplate drilled. The plates have to present a perfectly flat surface for the piston ring to work against, and the edges of the plates have to be absolutely square to prevent leakage. Speed of erection is one of the advantages of the waterless holder; and the description which Mr. Rogers gives of the powerful cold-flanging machine—which, embodying the experience obtained from the others in Germany and the United States, is accurate to a few thousandths of an inch—is most intriguing, as also is his account of a milling machine which has a capacity of 30 ft. at one setting, and machines the plates on five faces.

Naturally Mr. Rogers has a good deal to say about the advantages of the waterless holder. In the first place, a holder of this type is no more than one-thirtieth to one-fortieth the weight of an ordinary holder with tank and water. Consequently the foundations required are small. Except at the circumference of the holder, only a thin slab of concrete—merely to level the ground—is needed; and, thanks to the small weight of the holder itself, a stores can readily be formed underneath. Apart from the well-known advantages of reduced upkeep costs, absence of corrosion, constant pressure (which can be pre-determined at will), and the fact that gas can be stored in a dry condition, there is the useful feature that this type of holder is specially adapted for extending. All that has to be done is to empty the holder, couple the piston to the roof, disconnect the latter from the standards, remove the windows, and build additional depths of side in the normal manner. As Mr. Rogers observes, a large amount of work on an extension of this kind could be accomplished in two or three months.

The experience gained as a result of operating waterless holders has permitted the production of a suitable tar (at present costing £7 per ton) for the seal—a tar, moreover, which does not vary unduly in physical properties and chemical composition throughout winter or summer. The question has from time to time been raised as to what would happen in the event of failure of the tar pumps. The answer is that the tanks at the top side of the holder contain about a week's supply of tar, so that, should any pump fail to act, there is a surplus available for that period. Regarding the consumption of electricity for the pumps, Mr. Rogers, during the course of the discussion which followed the reading of his paper, stated that, for a 1-million holder, the annual current consumption is from 217 to 265 units. One of the members of the Association queried how long the canvas strip of the seal would last; and the author, having observed that the canvas seal of a holder erected in 1916 is to-day in as good a condition as when it was put in, remarked that the entire canvas seal for a 2-million holder can be replaced in about two days. Mr. Rogers has done good service to the industry by the presentation of new facts of practical importance on the manufacture, erection, and working of the waterless holder.

Private Bill Proposals.

THOUGH by no means numerous, the Private Bills relating to gas undertakings which have been drafted for the consideration of Parliament this year are in many respects striking. So interesting are they, indeed, that our review of their provisions, while as yet but little more than half completed, has already occupied space in three issues of the "JOURNAL." New conditions call for fresh provisions; and the Bills generally demonstrate full appreciation on the part of gas administrators of the measures that are best calculated to meet the requirements of the situation. This will have been noted from the provisions to which attention has so far been drawn.

Powers to enter into agreements with other gas undertakers, and to take financial interest, according to the needs of the particular case, appear in various Bills; while in measures promoted by the Gas Light and Coke Company and the Newcastle-upon-Tyne and Gateshead Gas Company, there is a clause having relation to the testing of dried gas. This latter clause stipulates that, when any process is employed for the purpose of extracting from the gas the whole or part of the water vapour contained in it, due regard shall be paid by the testing authority to the fact that such process is in use. The Bill of the former Company, of course, gives further evidence of the faith in amalgamation of the Gas Light and Coke Company, who are wishful to further greatly extend their already enormous area by the acquisition of the undertakings of the Grays and Tilbury Gas Company and of the Pinner Gas Company. In another direction, too, the Aldershot Gas, Water, and District Lighting Company are pursuing the same policy; for, under the new and shorter title of the Southern Power Company, they suggest that authority should be given them to acquire, by agreement but not otherwise, from local authorities or others, Electricity Orders that may have been granted to them, relating to a district in proximity to the area of the Company.

Basic prices and dividends form an important feature of several of the Bills already reviewed—*i.e.*, Newcastle-upon-Tyne, Romford, and Sheffield. In the case of Newcastle, it is stipulated that, not later than in the session of 1939, the Company shall promote a Bill in Parliament proposing a revision of the basic prices, or giving an opportunity for such revision. The proposal of the Romford Company is that at any time after three years the Board of Trade shall have power of revision; while in the Sheffield Bill the clause reads that the basic prices may, at any time, and from time to time, be revised by the Board. Proof of wide realization of the success that has attended this now well-tried system is furnished by the sections appearing in different Bills to allow of the establishment of profit-sharing. The admirable relations which exist between employers and employed in the gas industry are the envy of many other branches; and there can be no loophole for doubting the fact that the introduction of co-partnership and profit-sharing has done much to foster this excellent spirit. Now these systems should be regarded both as an inducement to and as a reward for good service. The Newcastle Company take powers to interest themselves in companies formed for the laying of pipes; and in their Bill there is a clause (referred to elsewhere in this issue) permitting them to appoint any chief engineer, general manager, or secretary to be a Director of the

Company under conditions laid down. But at no time is there to be more than one such person holding office.

This week we have a lengthy review of the Bill being promoted by the Sheffield Gas Company, which contains a series of noteworthy provisions. One of these is to secure the laying of mains when requested by the Corporation or other body responsible for the public lighting; but no such new main shall be required to be laid during the months of November, December, January, and February. Main extensions which the Company themselves may desire to make shall not be carried out until the Corporation have signified their approval. Clauses place upon the Company the obligation to supply gas, for street lighting and other purposes, upon specified conditions; and there is a part of the Bill which relates to coke oven gas. This gas, when supplied for lighting, is to be subject to the same regulations in the matter of testing as any other gas sent out by the Company; but that will not apply to coke oven gas supplied for purposes other than lighting, and by means of mains through which other gas is not furnished. All such gas must possess a distinctive and readily perceptible smell; and there is a reservation that the Home Secretary may at any time, either before or after the Company shall have commenced to give a supply of coke oven gas to consumers, make (in the interests of safety to persons) regulations with respect to such supply. Special provisions with regard to gas supply to working-class houses are to be found in a Bill of the Smethwick Corporation, who seek to be enabled, at the request of an occupier, to instal the essential pipes and fittings—causing no unnecessary damage and repairing such damage as may be done. The owner of the house is to be entitled at any time to purchase these pipes and fittings.

Area Gas Supply Committee.

As announced in to-day's "JOURNAL," the Board of Trade have appointed the Committee to undertake an investigation, recommended by the National Fuel and Power Committee, respecting the technical and economic aspects of an area gas supply system in relation to a limited area such as that between the Humber and Liverpool and between Leeds and Birmingham. Among the members of the Committee are Mr. Thomas Hardie, M.Inst.C.E., Chief Engineer to the Gas Light and Coke Company; Mr. Samuel Tagg, M.Inst.C.E., J.P., Engineer and Manager of the Preston Gas Company; and Dr. C. H. Lander, Director of Fuel Research, Department of Scientific and Industrial Research.

Officers as Directors.

Students of Parliamentary matters will have noted in last week's issue of the "JOURNAL" the fact that the Newcastle-upon-Tyne and Gateshead Gas Company, in a Bill which they are now promoting, are seeking authority to appoint any chief engineer, general manager, or secretary to be a Director of the Company—provided that in no event shall there be at the same time more than one such person holding office as a Director, and that any person so appointed shall, unless the appointment is approved by a majority of the shareholders at the next annual general meeting, cease to be a Director. Any Director appointed under these provisions is not to be subject to retirement by rotation. By a somewhat curious coincidence, almost at the moment of publication of the terms of this section we learned of a step in the same direction which has been taken by another important gas undertaking in the North of England—Mr. Norman S. Cox and Mr. C. Dru Drury, while continuing to hold their official positions as Secretary and Engineer respectively, having been elected Directors of the Sunderland Gas Company. It would be difficult to find two men better fitted to act as Directors; and the new arrangement is one that should work well in the interests of the undertaking.

Slippery Roads.

When reference is made to the slippery nature of certain road surfaces, proper discrimination is not always shown in describing these surfaces—the word "tarred" being apt to be applied without proper investigation. When a wrongful description is given, those who know "what is what" will be rendering good service to an important national industry if they will follow the example of Mr. Frank H. Jones, M.Inst.C.E. Mr. Jones, in his position as Chairman of the British Road Tar Association, has been writing to "The Times" protesting against the application of the term "tarred road" to a slippery road which was not tarred. He says: "The Association of which I am Chairman have investigated numerous complaints as to the slippery nature of so-called 'tarred roads,' and without exception it has been found that such roads were not tarred roads. While it is evident that you are well aware of the true nature of these slippery surfaces, since you refer to them as 'the new bituminous roads,' it is clear that there is no such discrimination in the mind of the general public. Viscountess Ipswich cites the instance of a road in Scotland which was safe for both horses and motorists; and such a road, I may say, is typical of tarred roads throughout the British Isles. I entirely endorse the appeal that something should be done. British tar, when mixed with a suitable aggregate, provides a slightly rough surface which is proof against skids in all weather for the whole life of the road. The solution of the slippery roads problem lies in the proper application and use of British tar, a bye-product of the carbonization of British coal."

Smokeless Fuel.

Mention has been made by "The Times" of the fact that the Gas Light and Coke Company are now placing upon the market as a smokeless fuel "Fuelite." In the current issue of the "Engineer," Mr. Robert Maclaurin writes at some length upon the product—"Kincole"—which results from the operation of his own process at the Dalmarnock Works of the Glasgow Corporation Gas Department. At one time, he says, "Kincole" was not selling as freely as had been hoped; but "since October the position has changed entirely. At the present time 'Kincole' is rationed-out to the coal merchants in rotation. Supplies to all the Corporation departments have been stopped, so that the domestic consumer can get supplies. Persons residing outside the city boundaries cannot obtain deliveries except as a favour." He finds this change difficult to account for, and goes on to say: "There is only one explanation known to me. 'Kincole,' like all other smokeless fuels, gives more heat per hundredweight than coal, and it has taken a longer time for the housewife to recognize its merits than I suppose any of the enthusiasts for smokeless fuel anticipated. The price in hundredweight bags, I believe, is 2s.; and at this price the housewife is now anxious to purchase. The sale is not a fancy sale to faddists; but it is being sold very largely in the working-class districts of Glasgow. The Corporation have had a very difficult task in developing this market for smokeless fuel, as they had in the initial stages to supply 'Kincole' in hundredweight bags to householders at considerable distances from Dalmarnock. The coal merchants, with a few exceptions, did more to hinder than encourage the sale; but the prejudice and conservatism seems at last to have been definitely overcome."

"Journal" Index.

It has been our custom to include the three-monthly "JOURNAL" index with the third number published in the following quarter; but as on the present occasion that issue has as a supplement the "Gas Salesman," the Index is being held over. It will appear with next week's "JOURNAL."

Low-Temperature Carbonization.

As our readers are aware, the Gas Light and Coke Company are erecting for the Government an installation of low-temperature carbonization retorts as developed at the Fuel Research Station of the Department of Scientific and Industrial Research. They are also installing a bench of the Hird low-temperature retorts for British Carbonised Fuels, Ltd. The two installations have been built by the Woodall-Duckham Companies, and should be started up some time during the next month.

The Mechanical World Year Book.—Messrs. Emmott & Co., Ltd., of King Street, Manchester, have just published the 1929 Edition of the Mechanical World Year Book, at the net price of 1s. 6d. This useful handbook, besides containing the calendar and diary for the year, has considerable practical information in the shape of temperature conversion tables, comparative stresses, price equivalents, Post Office Regulations, &c.

PERSONAL.

Noteworthy honour has been done to Mr. NORMAN S. COX (Secretary) and Mr. C. DRU DRURY (Engineer), who, while continuing to hold their respective official positions, have been elected Directors of the Sunderland Gas Company. We desire to join our congratulations to those of which they have already been the recipients.

The Newtownards Urban Council have adopted the recommendation of the Gas Committee that Mr. JOHN P. M'ILWAINE be appointed Gas Manager for three years. Mr. M'Ilwaine, who is a native of the town and received his training under his predecessor, Mr. Robert Scott, has been Acting Manager for some time.

Mr. G. J. GREENFIELD, Manager of the Fell Coke Works of the Consett Iron Company, Ltd., has been appointed as Works Manager of the Thorncliffe Coal Distillation, Ltd., one of the subsidiary Companies of Messrs. Newton Chambers & Co., Ltd., of Sheffield. The Thorncliffe Company are replacing their present coke oven plant with a new installation consisting of 59 Becker ovens capable of dealing with 1200 tons of wet coal per day. Mr. Greenfield, who will also take over control of Messrs. Newton Chambers' Carr distillation plant and disinfectant works, will succeed Mr. Robert Ray as this year's President of the Coke Oven Managers' Association.

Colonel Sir EDWARD ALLEN BROTHERTON sailed from Liverpool on Jan. 4 on the "Duchess of Atholl," for an extended tour in South America and South Africa. He is expected to return to Yorkshire during May. Sir Edward will be calling at the lonely island of Tristan da Cunha in the Southern Atlantic, and will also visit Palestine.

Mr. ROBERT RAY, President of the Coke Oven Managers' Association, who has joined the staff of the Woodall-Duckham Companies, was the recipient of presentations at the Thorncliffe Colliery Offices recently from the officials and staffs of Thorncliffe Coal Distillation, Ltd., and Newton Chambers & Co., Ltd. Mr. Ray was for seven years Works Manager of Thorncliffe Coal Distillation, Ltd., and Chemical Works Manager of Newton Chambers & Co., Ltd.

OBITUARY.

On Jan. 7 the death occurred, in his 84th year, of Sir HENRY TRUEMAN WOOD, who served the Royal Society of Arts for nearly half-a-century. In 1876 he was appointed Assistant Secretary of the Society, and three years later became Secretary. He had a talent for efficient administration; and in a tenure covering nearly four decades he had the satisfaction of seeing a remarkable advance in membership, reputation, and the standard of lectures. When he retired from the office in 1917, he was appointed Treasurer; and his Chairmanship of the Council in 1919 brought his service up to 47 years.

FORTHCOMING ENGAGEMENTS.

Jan. 18.—INSTITUTION OF CHEMICAL ENGINEERS.—Meeting at the Institution of Civil Engineers, 6.30. Lecture by Prof. J. W. Cobb on "The Reactivities of Solid Carbon in Fuel Processes."

Jan. 19.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Meeting in Halifax. Paper by Mr. J. W. Denton, on "High-Pressure Governors and Plant."

Jan. 21.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Dinner and dance at the Grand Hotel, Birmingham.

Jan. 21.—ROYAL SOCIETY OF ARTS.—Meeting in John Street, Adelphi, W.C. 2, at 8 p.m. First Cantor Lecture by Dr. C. H. Lander on "The Treatment of Coal."

Jan. 25.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at the Westminster Technical Institute. Paper by Mr. C. A. Masterman, on "The Thermal Insulation of Gas Consuming Apparatus."

Jan. 26.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to Messrs. Peebles & Co., Ltd., Tay Works, Bonnington, Edinburgh.

Jan. 28.—ROYAL SOCIETY OF ARTS.—Meeting in John Street, Adelphi, W.C. 2, at 8 p.m. Second Cantor Lecture by Dr. C. H. Lander on "The Treatment of Coal."

Feb. 4.—ROYAL SOCIETY OF ARTS.—Meeting in John Street, Adelphi, W.C. 2, at 8 p.m. Third Cantor Lecture by Dr. C. H. Lander on "The Treatment of Coal."

Feb. 12.—NATIONAL GAS COUNCIL.—Meeting of the Central Executive Board.

Feb. 12.—FEDERATION OF GAS EMPLOYERS.—Meeting of Central Committee.

AREA GAS SUPPLY COMMITTEE.

The Board of Trade have appointed the following Committee—

Sir ALEXANDER WALKER, K.B.E. (Chairman),
Mr. THOMAS HARDIE, M.Inst.C.E.,
Mr. C. H. LANDER, C.B.E., D.Sc., M.Inst.C.E.,
Mr. W. A LEE, C.B.E.,
Mr. M. MANNABERG,
Sir R. A. PEASE, Bart., J.P.,
Mr. S. TAGG, M.Inst.C.E., J.P.,

to undertake an investigation as recommended by the National Fuel and Power Committee in its report of September, 1928, in relation to a limited area, such as that between the Humber and Liverpool and between Leeds and Birmingham, respecting the technical and economic aspects of an area gas supply system, comprising an inter-connecting network of pipelines fed by a number of gas-works, coke ovens, and the like.

Mr. R. J. MOFFAT is the Secretary and Mr. D. HAIGH the Assistant Secretary of the Committee. Communications should be addressed to the Secretary, Area Gas Supply Committee, Board of Trade, Great George Street, S.W. 1.

ON THE ELECTRICAL SIDE.

Central Electricity Board Schemes.

Large contracts are being placed by the Central Electricity Board, in connection with the preliminary work of organizing the various schemes into which Great Britain is to be divided. Four schemes have, it may be stated, already been approved by the Board, involving an expenditure of £17,000,000: Central Scotland, £2,204,000; South-East England, £6,691,000; Central England, £3,600,000; North-West England and North Wales, £4,835,000. A fifth scheme—the Mid-East England—which affects Yorkshire and Lincolnshire, will be announced shortly. The Act provides for the reference of disputed questions to arbitration; but it has not been found necessary to arbitrate in relation to any of the four adopted schemes. The areas covered by these schemes, and the extent of overhead transmission lines which are being put up are: Central Scotland, 5000 sq. miles, 228 miles of lines; South-East England, 9000 sq. miles, 511 miles of lines; Central England, 7000 sq. miles, 370 miles of lines; North-West England, 9000 sq. miles, 340 miles of lines. There are 623 authorized undertakers for the supply of electricity in Great Britain, and they own 570 stations. Under the schemes, the more efficient stations are "selected," and the smaller and inefficient ones are closed-down.

Troubles of the Industry.

We have been accustomed to hearing our (younger) sister industry referred to as the "spoiled child;" and it has therefore caused us some little astonishment to read that "unless the Tory Government are prepared to relieve the electric supply industry of some of the wicked burdens that they themselves have fastened upon its back, their rivals and critics will soon be pointing out that they have done more to damage the cause of cheap and abundant electricity than any other British Government that ever existed." We seek an explanation, and find that not long ago it was pointed out in an authoritative quarter "that the two Acts of Parliament which have been passed since the Government first began preaching the gospel of cheap electricity have gone a very long way towards counteracting the advantages which the 1926 measure was supposed to bring about. Since those advantages were first promised, in 1925, we have had the Rating and Valuation, Act, 1925, and we have had the Rating and Valuation (Apportionment) Bill, 1928. The former has resulted in a very cruel rise in assessments; they are increased from three times to as much as ten times the older figure. The latter (1928) Bill offers a heavy premium to independent generating plant by relieving private firms while refusing to relieve public supply undertakings."

Too Many Tariffs?

Reference was made in last week's issue of the "JOURNAL" to a paper by Mr. J. E. Tapper, of Beckenham, on the subject of hire and hire-purchase schemes, which he read before the Electrical Development Association Salesmanship Conference. The electrical industry, like the gas industry, finds in maintenance a matter which is closely bound up with their development; and so the paper gave rise to a keen discussion. Novelty can accomplish much, but lasting success is to be hoped for

only in the case of appliances that "wear well," which means that they must be kept in good order. One speaker in the discussion expressed the view that the electricians could do no better than follow the example of their competitors, who would put in a cooker or other apparatus on hire or hire-purchase. The difference of maintenance between the two was considerable in many ways; but the gas people had been successful in building-up the business they were out for among working-class and middle-class consumers. The first essential for success, he went on to say, was an attractive tariff. They suffered from too many tariffs; and it would be better if they could get down to a simple tariff. Working-class people had a difficulty to-day in paying for their houses; and if they could get a simple tariff and simple hire, they would progress. It would be fatal to electric cooking, however, if they were going to allow the consumer to buy the cooker, and leave him to maintain it.

Carlisle's Electricity Station.

It is anticipated that the new electricity station of the Carlisle Corporation will play an important part in the Government's national electricity scheme, so far as North-West England is concerned. The main grid trunk line from North Wales will come through Preston, Lancaster, Kendal, Shap, and Penrith, to Carlisle, where it will terminate, until some other area is scheduled. This main line will provide for the interchange of current between Carlisle and Lancashire. The current will be supplied from the Carlisle Corporation generating station, the Corporation selling the current to the Board, who will distribute it by means of overhead lines, and re-sell it to authorized electrical undertakers who have no generating facilities. A subsidiary line will supply current for West Cumberland, including Keswick and Penrith. Although at present no provision is made for the North Cumberland area, it is expected that this area, and also a portion of the South of Scotland, will ultimately be supplied.

Beauty of the Lakes.

There will be two sets of lines between Carlisle and Penrith; but whether they will be carried on the same overhead standards, has not yet been decided. Generally the overhead cables will run across country without regard to roads. As to the routes suggested, the Electricity Board claim that they have chosen the most acceptable from the point of view of keeping the cables as much out of sight as possible. The Board are anxious to meet local wishes in regard to the type of overhead transmission standard to be adopted; and they propose to send photographs of different types of these to the Cumberland Joint Town Planning Committee, who will make a recommendation in due course, and also consider the proposed routes and other aspects of the scheme. Meanwhile, members of the Keswick Urban District Council have been expressing their own views on the matter; and these were anything but friendly towards overhead transmission through Lakeland. A resolution was passed urging that, in their area, the cable should be put underground. One of the members stated that "concrete bases and 50 ft. to 60 ft. high steel towers would be most unsightly in that district." They certainly will not add to the "Beauty of the Lakes."

GAS STOCK AND SHARE MARKET.

[For Stock and Share List, see later pages.]

Buoyant conditions prevailed throughout the stock markets during the past week. Anglo-American favourites still provided the most excitement; but the animation spread to other sections, and Home and Foreign Rails, Rubbers, and Textiles all displayed strength. Gilt-edged stocks wavered slightly, but resumed the usual high standard towards the close of the week, with 5 p.ct. War Loan as usual leading the way. The big New Zealand loan had scarcely any effect on the market.

It rarely happens that Gas Stocks are given any prominence; but the publication of the report of the Sub-Committee of the National Fuel and Power Committee gave a distinct uplift to these stocks. The recommendations include the removal at the earliest possible moment of irksome financial restrictions; and the introduction into Parliament of an agreed Bill, embodying the Committee's recommendations, is looked forward to.

It will be seen from the Table that a number of stocks improved in value during the week, but the activity in Continental Union and Imperial Continental stocks continued to dominate the market. The first-named rose 8 points, to 120-125, on the week, and the latter no less than 35 points to 245-255. The reason of the demand for the Imperial Continental stock is still a mystery. The quotation a month ago was only 167-170, and so far it has not been possible to find any justification for the improvement.

The following transactions were recorded during the week:

On Monday, British 116, 116½, Colonial 24s., Commercial 3 p.ct. deb. 58⅜, Continental Union 115, 118, 118⅛, 119, 119½, 120, 121, 7 p.ct. pref. 107, Croydon max. div. 86½, European 10¼, 10⅛, 10⅜, 10¾, Gas Light and Coke 18s. 1½d., 18s. 4½d., 18s. 6d., 18s. 7½d., 3½ p.ct. 64, 4 p.ct. pref. 79¼, 80¾, 3 p.ct. deb. 59¼, Imperial Continental 219½, 220, 224, 226, 230, 235, 238, 240, 249, 250, Liverpool 7 p.ct. pref. 101½, Portsmouth consolidated 110, 111, 5 p.ct. max. 80, 81, Primitiva 26s. 3d., 26s. 6d., 26s. 7½d., 4 p.ct. con. deb. 79, San Paulo 6 p.ct. pref. 8½, South Metropolitan 107, 3 p.ct. deb. 60¼, 61. Supplementary prices, Bournemouth 7 p.ct. deb. 103½, Colombo new ord. 35s. 6d., 36s., Gas Light and Coke 5 p.ct. deb. 100¾, Liverpool 5 p.ct. 90, Romford "B" 8¾.

On Tuesday, British 7 p.ct. pref. 118, Cape Town 4½ p.ct. pref. 6⅞, Continental Union 120, 121, 122, 122½, 123, Croydon max. div. 87, European 10⅛, 10¾, 10⅞, 11, 11⅛, Gas Light and Coke 18s. 3d., 18s. 6d., 18s. 7½d., 3½ p.ct. max. 64½, 4 p.ct. pref. 79½, 80¼, 3 p.ct. deb. 60, 5 p.ct. deb. 100¾, Imperial Continental 250, 251, 251½, 252, 252½, 253, 254, 255, 257, Liverpool 7 p.ct. pref. 102¾, Primitiva 26s. 3d., 26s. 4½d., 26s. 6¾d., 26s. 7½d., 26s. 9d., South Metropolitan 107¾, 3 p.ct. deb. 60½, 61, South Suburban 5 p.ct. deb. 99, Tottenham "B" 102⅜. Supplementary prices, Gas Light and Coke 5 p.ct. deb. 100¾.

On Wednesday, Aldershot "C" 75, 77, Cape Town 4½ p.ct. pref. 7⅛, Continental Union 120, 121, 121½, 123, 124, 124½, European 11, 11⅛, 11⅛, 11¼, 11⅜, 11⅝, Gas Light and Coke 18s. 3d., 18s. 4½d., 18s. 6d., 18s. 7½d., 3½ p.ct. max. 64, 64½, 4 p.ct. pref. 80¼, 3 p.ct deb. 60, 60½, Imperial Continental 250, 250½, 251, 252, 253, 253½, 254, 254½, 254⅝, 255, 255¾, 256, Portsmouth 4 p.ct. con. 112, Primitiva 26s. 4½d., 26s. 6d., 26s. 7½d., South Metropolitan 106⅜, 107, South Suburban 5 p.ct. 110, Southampton 5 p.ct. max. 78. Supplementary prices, Brighton 4 p.ct. deb. 78, 78½, Liverpool 5 p.ct. 91½, North Middlesex 6 p.ct. pref. 110.

On Thursday, Bombay 21s., Continental Union 120, 121, 122, 122½, 122⅝, 123, Croydon sliding-scale 112, European £11 8s. 9d., 11½, 11⅛, Gas Light and Coke 18s. 6d., 18s. 7½d., 18s. 9d., 3½ p.ct. max. 65, 4 p.ct. pref. 79½, 79⅝, 3 p.ct. deb. 60½, Imperial Continental 240, 241, 242, 243, 244, 245, 245½, 247½, 248, 249, 250, Lea Bridge 5 p.ct. 120, Portsmouth 5 p.ct. max. 81, Primitiva 26s. 3d., 26s. 4½d., 26s. 6d., 26s. 7½d., 26s. 9d., South Metropolitan 107, 107½, 107¾, South Suburban 5 p.ct. 111, Southampton 5 p.ct. 79. Supplementary prices, Bournemouth new 6 p.ct. pref. £11 9s. 3d., Gas Light and Coke 5 p.ct. deb. 101, Liverpool 5 p.ct. 90⅝, Southend-on-Sea new "B" 89½, 90.

On Friday, Bombay 21s. 9d., British 116, Continental Union 120, 121, 122½, Croydon sliding-scale 112¾, European 11½, 11¾, Gas Light and Coke 18s. 6d., 18s. 7½d., 18s. 8¼d., 18s. 9d., 3½ p.ct. 65, 3 p.ct. deb. 60⅛, Imperial Continental 242, 244, 245, 246, 246½, 247, 249, 250, 250½, 251, 252, 252½, 253, 255, Newcastle 4 p.ct. pref. 73¼, 73⅜, Primitiva 26s. 3d., 26s. 7½d., 26s. 10½d., South Metropolitan 106½, 107¾, 108, South Suburban 5 p.ct. 111, Wandsworth 5 p.ct. pref. 92½. Supplementary prices, Gas Light and Coke 5 p.ct. deb. 100¾, 101, Harrogate new con. 167½.

The Editor (or Our Stock Market Correspondent) would be glad to receive notification from Secretaries of Companies of the prices of private transactions, especially when made above or below the stock exchange quotation.

The reduction in the German Bank rate from 7 to 6½ p.ct. imparted a feeling of confidence in the Money Market; and this was accentuated by a fall in the average rate at which the week's Treasury Bills were allotted—£4 5s. 4·26d. p.ct., or 1s. 1·73d. below that for the previous week. As a rule fresh money for the night was obtainable at 3½ p.ct., and old day-to-day loans were renewed at this rate down to 3 p.ct. Discount rates showed no variation.

On the Foreign Exchange Market, German marks, on the rise in that country's bank rate, rose to 20.42, and subsequently closed at 20.40¾. Similarly the Dutch exchange moved up to 12.09¼. The dollar-exchange, however, showed no variation on balance at 4.85⅝; but there was a further advance in the Paris rate to 124.120. The Milan rate closed at 92.70½; Pesetas finished at 29.71; French francs were quoted at 124.12; and Belgas at 34.90.

Silver was easier on Chinese sales at 26¾d. per oz.; while the price of Gold remained at 84s. 11½d. per oz.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21, 1927. The Banks' deposit rate is 2½ p.ct., and the deposit rates of the discount houses are 2½ p.ct. at call and 2¾ p.ct. at notice.

EDUCATION FOR RESPONSIBILITY.

Discussed by the Association for Education in Industry and Commerce.

There was a meeting in the Mechanics Theatre at University College, Gower Street, on Friday, Jan. 4, to discuss the subject of "Education for Responsibility." The chair was occupied by the Right Hon. Lord Riddell, the President of the Association; and addresses were given by Mr. William Clower (Chief Officer for Labour and Establishment to the L.M.S. Railway Company) and Mr. G. H. Gater, C.M.G., D.S.O., M.A. (Education Officer to the London County Council).

Mr. F. W. Goodenough, C.B.E. (Chairman of the Board of Education Advisory Committee on Education for Salesmanship) had promised to speak; but the President announced that unfortunately, owing to indisposition, he was unable to be present. The following remarks, which he had prepared, were, however, read by Mr. R. W. Ferguson (Hon. Secretary of the Association).

THE GOVERNMENT INQUIRY: HOW WE MAY ALL HELP.

By F. W. GOODENOUGH.

I have been asked to speak on the subject of "Education for Responsibility" from the point of view of the Chairman of the Government Committee on Education for Salesmanship, and of one who is constantly concerned with that problem in daily practical business life. The two subjects are, indeed, very closely allied, for salesmanship—or commerce, to use the larger term, which includes salesmanship—is essentially a calling in which fitness for responsibility is a primary qualification.

Education for responsibility is obviously not so much a matter of syllabus and curriculum, or of laboratory or workshop practice, as of a drawing-out of personal qualities, a training and general education that will bring about fitness for responsibility. Education for responsibility therefore implies not merely or mainly the acquirement of all-round knowledge of whatever job one is held responsible for. That, while very important, is a secondary matter, as such knowledge can readily be acquired as occasion arises by the man who is already fitted to take and exercise responsibility. Education for responsibility implies primarily the acquirement of:

> A sound general knowledge of world conditions and affairs.
>
> Knowledge of human nature, acquired especially by experience in complying with, as well as exercising, discipline.
>
> The qualities of initiative, courage, energy, and persistence.
>
> Respect for, and tolerance of, other people's opinions and points of view.
>
> A realization of the importance of being guided in action by definite principles constantly and consistently applied to every circumstance—the principles of honesty of word and deed; of justice, mercy, charity, and equity of temper; and a readiness to "do as you would be done by."

In short, education in the application of the Golden Rule to every-day commercial and industrial life as fully and completely as to life in every one of the professions. Put in the fewest possible words, education for responsibility means the development of character.

Commerce will only come into its own, and be regarded as as honourable a calling as any of the professions, when it is recognized by those who engage in it as essentially a branch of public service, with ideals based upon principles. Then it will be a source of honour, and not of reproach, to be termed a "Nation of Shopkeepers."

In commerce, as in every walk of life, responsibility is a matter of human relationship—responsibility of the employer to the employee, and of the employee to the employer; responsibility of one colleague to his fellows; responsibility of all the units making up a firm to its customers; responsibility of the firm to its competitors. So in this matter of education for commerce—or education for salesmanship, or education for responsibility, however you speak of it—there are the human relations to remember that are implied in the responsibility of the parent to the child, the responsibility of the teacher to parent and child, and the responsibility of the employer to his present and his future employees.

We of the Committee on Education for Salesmanship regard it as our primary business to do all we can to awaken parents, teachers, and employers alike to a realization of, first, the need for education for the responsible work of salesmanship, and, secondly, of the worthiness of commerce as a responsible and honourable calling. Of the need for greater attention to this question of education for the responsible work of maintaining and increasing the sale of British goods at home and abroad, evidence constantly accumulates; and I may say that I am much indebted to our Chairman, Lord Riddell, for the close interest that he is taking in the work of the Committee, which he shows by furnishing me frequently with pieces of evidence that come his way.

Fault has been found with us recently by a manufacturer for criticizing British salesmanship abroad, which he appears to regard as incapable of improvement. Well, criticism of one's fellow countrymen is never a grateful task, and none has been uttered except what is amply supported by facts. But our feeling in regard to those who are annoyed by such criticism is that it is better to be annoyed by criticism if it will only arouse one to think, than to slumber pleasantly in a "fool's paradise;" and the fact that there is any manufacturer in this country who regards British salesmanship abroad as substantially perfect, demonstrates that there is great need for education among the manufacturers as well as among their employees.

I hope that the discussion at to-day's conference may play some part in arousing British manufacturers and merchants to a realization of the fact that education for salesmanship is much needed, and that the solution of the problem of providing it is as much their responsibility as it is that of the Committee of business men who are at present considering it, and are about to seek the views of leading firms throughout the country as to the best way of serving the trading community in this particular direction.

GOODWILL ESSENTIAL.

The PRESIDENT said they were all agreed that goodwill between employers and employed, between various sections of employed, and (if he might say so) between different sections of employers, was very necessary for the satisfactory conduct of any business; and in order to secure it, all parties must be imbued with the right spirit. What the employers were looking out for was persons who were anxious to undertake responsibility; and it was very difficult to find them. He did not know whether the present educational system was going to produce the right men. What they wanted was the class of men who would enable this country to maintain its glorious trading traditions. It was no use being cultured, if one could not live; and this country depended upon its exports.

The President and speakers were heartily thanked, on the proposition of Mrs. M. A. Cloudesley Brereton.

It may be mentioned that the President-Elect of the Association is Sir Max Bonn, merchant banker.

NEW SMOKELESS FUEL.

Low-Temperature "Fuelite" to be Marketed by the Gas Light and Coke Company.

It was stated in "The Times" for Wednesday last that the installation of low-temperature carbonization plant at Richmond by the Gas Light and Coke Company, in conjunction with the Fuel Research Board, is now almost completed, and by the end of this month a new smokeless fuel will be put on the market.

As our readers are aware, about two years ago the Gas Light and Coke Company were asked by the Government to examine all existing low-temperature carbonization plants, and consider whether they were prepared to try out that process which appeared to them the most promising for working in connection with a London gas-works. The Company selected the process developed at the Fuel Research Station at Greenwich, and the plant was installed at the Company's Richmond Works. The conditions ensure a thorough trial for two or three years; and the knowledge and experience gained will be at the disposal of all interested.

The new fuel, which will be known as "Fuelite," is expected to prove more economical than good-class house coal. Arrangements are being made to produce 150 tons a day. The first supplies will be available for delivery towards the end of the month. The Company propose to take orders at the following prices delivered to cellars: In lots of one ton and upwards, 48s. per ton; in lots of less than one ton, but not less than 4 cwt., 50s. per ton; and in lots of less than 4 cwt., 53s. 4d. per ton. The present price of good-class coal ranges from 50s. to 52s. 6d. per ton. It is claimed for "Fuelite" that it ignites easily, is smokeless, and gives a radiant glow.

REPORT ON GAS LEGISLATION OF THE SUB-COMMITTEE OF THE NATIONAL FUEL AND POWER COMMITTEE.

The National Fuel and Power Committee, of which Lord Melchett is Chairman, have presented to the President of the Board of Trade, the Rt. Hon. Sir Philip Cunliffe-Lister, K.B.E., M.C., M.P., the Report of the Sub-Committee appointed to consider the Memorandum prepared by the National Gas Council (see "JOURNAL" for Oct. 6, 1926, p. 25), relating to amendments of existing gas legislation, and another Memorandum, prepared by the Board of Trade, outlining additional proposals. We publish the latter Memorandum to-day. The National Fuel and Power Committee are in substantial agreement with the findings of the Sub-Committee, which are published below.

We beg leave to report that we have, in accordance with the Committee's request, examined the memoranda put forward by the National Gas Council and the Board of Trade containing proposals for amending existing legislation relating to gas.

To assist us in examining the proposals, and to draw up this report, we invited representative bodies of local authorities, and other parties who appeared to us to be concerned, to submit their observations on the various proposals. In framing our recommendations we have had in mind the views of these bodies, so far as they have been put before us, and we have endeavoured to give effect to their suggestions in drawing up this report.

The National Gas Council claim, by their membership, to be representative of the gas industry to the extent of approximately 90 p.ct. of the total gas sold by statutory and non-statutory undertakings.

The other parties from whom we have received and considered statements are as follows: The County Councils' Association; the Association of Municipal Corporations; the Urban District Councils' Association; the Rural District Councils' Association; the London County Council; and the Association of British Chemical Manufacturers.

The Gas Companies' Protection Association were invited to put before us any observations they had on the proposals, but they have not seen fit to favour us with observations.

The proposals under examination may, for convenience, be divided into the following main headings:

I.—Proposals of the National Gas Council and the Board of Trade for simplifying the procedure under which statutory gas undertakers obtain their powers, and so facilitating the working of those undertakings.

II.—Proposals of the Board of Trade for extending the operation of the thermal system of charging for gas, and imposing on all gas undertakers, whether statutory or not, a standard of purity and pressure.

III.—Proposals of the Board of Trade for conferring statutory powers on certain of the larger non-statutory gas undertakers, subject to the usual restrictions.

IV.—Miscellaneous proposals of the National Gas Council and the Board of Trade for amending, in certain respects, the Gas Regulation Act, 1920, and other general enactments applicable to gas undertakers, to render them suitable to present-day requirements.

I.—PROPOSALS FOR SIMPLIFYING PROCEDURE.

It has been submitted to us, and we are satisfied, that the present procedure under which statutory gas undertakers are required to apply to Parliament or the Board of Trade when further powers are required is unnecessarily costly and cumbersome, and that with regard to such matters as the amount of capital which may be raised, the method of obtaining capital, and arrangements for joint working between neighbouring undertakers, it should be made possible to obtain powers more cheaply and expeditiously than present machinery permits.

The facilities for which the National Gas Council press can, we consider, be granted without prejudice to the interests of consumers and other interested parties if the safeguards we recommend are adopted. We consider this step necessary to enable gas undertakers to develop on more usual business lines, unhampered by restrictions, so far as this is possible having regard to the obligations of public utility undertakings.

We are informed that, under present procedure, the minimum cost of obtaining even an unopposed Special Order amounts to approximately £200, and that the average cost of such an Order is £300. If applications for these Orders are opposed, these figures are considerably exceeded, and the cost of promoting a Private Bill in Parliament is prohibitive to all except the very large undertakings. As a result of this position, certain undertakings are to-day operating under unnecessarily arduous restrictions imposed many years ago, and are hampered in their operations by the fact that the cost of obtaining authority even to raise capital to meet extensions of business would reflect definitely on the cost of supplying gas.

Under the present Special Order procedure it is necessary for applications to be advertised, and for notice to be given to local authorities and others so as to afford an opportunity for objections to be raised if the powers sought are contrary to the interests either of those parties or of consumers in general. This provision also affords an opportunity to bring before the Board of Trade any matters of public interest affecting the operations of the undertaking. We regard the retention of these requirements as essential, and we do not recommend any amendment in regard to the present machinery regulating applications to the Board of Trade for Orders. In so far as the following matters are concerned, however, we are of opinion that the interests of consumers and other parties will be sufficiently protected if an opportunity is retained for them to appear at a Board of Trade inquiry before an application is granted. We do not consider, save in exceptional cases, that gas undertakers should be required to incur the further expense and delay occasioned by submitting to Parliament Draft Orders dealing only with these matters, where the expense of refuting further opposition may be occasioned, notwithstanding that a full inquiry has been already held into the matters in question. We accordingly recommend that, subject to the reservations set out below, an alternative procedure to that under section 10 of the Gas Regulation Act be provided to enable gas undertakers to obtain from the Board of Trade, by means of a Departmental Order, the powers required in relation to the matters set out below:

(1) The power to raise additional capital and borrow money on mortgage, including the granting of borrowing powers to local authorities in respect of gas undertakings owned by them. In this connection we are informed that it is customary to restrict the borrowing powers of statutory gas companies to one-half of the paid-up capital of the company. We would see no objection to the granting of borrowing powers to a greater extent than this, in approved cases, and would suggest that, inasmuch as this is in the first instance a matter for the shareholders to determine, the limit might, with advantage, be increased even to an extent equal to the paid-up share capital where the Board of Trade are satisfied that it is for the good of the undertaking in question.

(2) The power to sliding-scale companies to pay a fixed minimum dividend, if the requisite funds are available, notwithstanding the operation of the sliding-scale provisions, such minimum dividend to be determined in each case by the Board of Trade after considering the circumstances of the particular company. We regard the principle of the minimum dividend as necessary to secure the confidence of investors and to protect shareholders from an undue fall of dividend when prices are required to be raised in cases of emergency.

(3) The power to companies who are regulated by a maximum price and maximum rate of dividend to adopt standard price and sliding-scale of dividend provisions; the standard price and standard dividend being fixed in each case by Departmental Order. We would see no objection to the extension of this power to enable the Board of Trade to grant, by Departmental Order, "basic" price and "basic" dividend provisions where they are desired.

(4) The power to offer new capital for subscription to existing holders, consumers, and employees (*i.e.*, workmen, servants, or officers other than directors) on terms to be approved by the Board of Trade.

(5) The power to issue as redeemable or irredeemable preference capital any unissued authorized capital. Included in this recommendation we suggest that power should also be given to sanction the issue of redeemable debenture stock where desired.

(6) The power to redeem obsolete capital; the extent of such redemption to be determined in each instance according to the circumstances of the case, due regard being had to the circumstances under which the capital has become obsolete, and to the manner in which the undertaking has been operated in the past.

(7) The power to institute an alternative method of charge (*i.e.*, the two-part tariff system) based in part on a service charge and in part on a commodity charge, and to make such amendments as may be necessary to the existing regulations governing a company's authorized dividend consequent on departure from the flat-rate system of charge. We are of opinion that the two-part tariff system of charge is calculated to lead to more advantageous working, and is, in the long run, the fairest method of charge. We consider, however, that, if the Board of Trade are authorized to sanction the

introduction of two-part tariff systems, due regard should be had by them to the necessity for affording sufficient protection for small consumers, and that, while it is obvious that the present method of regulating dividends according to the price of gas to the ordinary consumer needs to be amended, authority to introduce a two-part tariff must not be accompanied by the removal of control over the dividends paid.

(8) The power to authorize joint working arrangements between undertakings, under which heading would be included authority to deal by Departmental Order with any of the following matters:
  (i.) The authorization of Joint Gas Boards of local authorities owning gas undertakings and/or gas companies and other companies, &c., affording or taking a supply of gas, and so to facilitate the linking-up of undertakings.
  (ii.) The power to companies to make capital contributions to a separate company, not issuing capital to the public, formed for the express purpose of laying and operating interconnecting mains, and in the case of local authority undertakings to authorize the payment of rents, &c., for the use of the mains.
  (iii.) The power to contribute to territorial gas associations formed for the assistance of small undertakings in scattered districts.
  (iv.) The power to hold shares in, and lend money to, other gas undertakings.
  (v.) The authorization of greater facilities for supplies of gas in bulk.
  (vi.) The joint use of plant and other facilities.
  (vii.) The joint use of purchase, transport, landing, delivery, &c., facilities.
  (viii.) The establishment of joint research establishments.
  (ix.) The provision of funds for (vi.), (vii.), and (viii.).
  (x.) Joint working with allied industries, including the granting of powers to hold shares in, and lend money to, allied industries.
  (xi.) The power to lay pipes outside the statutory area of an undertaking, such powers to be exercised in accordance with the provisions of the Gas-Works Clauses Acts with regard to the laying of pipes within the statutory area.
  (xii.) The power to grant, in cases of agreement, wayleaves over private property, and so to facilitate the linking-up of mains. In cases where no agreement is reached, we suggest rather than that the Board of Trade should have arbitrary power in the matter, that provision should be made for the appointment of an independent arbitrator to decide as to the terms and conditions under which wayleaves shall be granted.

(9) The power to grant what may be termed a "Fringe Order"—that is, an Order which will permit an undertaking in special cases to supply gas to premises outside its statutory area, where it is shown either that the premises are not within the area of another statutory undertaking, or that they can, by this means, be more conveniently and more economically supplied than if required to obtain their gas from the undertaking having statutory powers in respect of their district.

(10) The power to confer statutory powers on non-statutory undertakings desirous of becoming statutory. In connection with this recommendation, however, the National Gas Council agree that a reservation should be made in respect of any case in which a request for power to purchase the undertaking is put forward by any local authority for the district concerned. We agree that, in such a case, procedure should be by Special Order requiring the approval of Parliament.

In addition to these proposals put forward by the National Gas Council, the Board of Trade suggest, and we see no objection to the proposal, that Departmental Order procedure should also be made available to deal with:

(1) The revision, where necessary, of standard or maximum prices per 1000 c.ft. applicable to those undertakings which will not be required to supply gas on a thermal basis (see Part II. of this Report)—such revision to be made on the lines indicated in section 1 of the Gas Regulation Act in the case of undertakings working on a thermal system of charge.

(2) The detailed provisions necessary in respect of those undertakings which will become statutory, and the requirements as to pressure, &c., which are to apply to non-statutory undertakings, if the recommendations contained in Part III. of this Report are adopted. The reservation we made under heading (10) above would, however, apply in these cases if a desire to purchase is put forward by the local authority concerned.

We assume in submitting this recommendation that the Board of Trade will require to be satisfied in all cases before granting an Order that the powers to be granted will not be utilized in a manner prejudicial to the interests of gas consumers, and that no exploiting of the gas industry would be possible for the purpose of furthering experimental work or giving financial assistance to uncommercial propositions.

II.—Proposals of the Board of Trade Relating to the Extension of the Thermal System of Charging for Gas, and the Imposition of a Standard of Purity and Pressure.

Sub-section (1) of section 1 of the Gas Regulation Act provides that the Board of Trade may, on the application of any gas undertakers, provide for the repeal of the provisions requiring gas to be supplied of any particular illuminating or calorific value, and substitute the power to charge for gas on a thermal basis—that is, according to the number of heat units supplied in the gas.

Sub-section (5) of that section enables the Board of Trade, in the case of any undertakers not applying for an Order within two years of the passing of the Act, to make an Order which shall have effect as though it were made on the application of the undertakers. We are informed that at the present time undertakers supplying approximately 91 p.ct. of the total gas sold by all statutory gas undertakers have obtained the power to supply on the thermal basis. Owing primarily to the extent to which the thermal system of charge has been adopted voluntarily, the Board of Trade have so far refrained from putting into operation their powers under section 1 (5) of the Act; but they suggest, and neither the National Gas Council nor the other bodies we have consulted are opposed to the suggestion, that as from "an appointed day" existing statutory gas undertakers, except the very small ones supplying under (say) 20 million c.ft. per annum, should now be required to supply gas on a thermal basis, and become subject to the purity, pressure, and testing requirements of the Gas Regulation Act.

We think that the operation of the Gas Regulation Act has shown that the thermal system of charge is a fair one, and affords the best possible protection for consumers; and we agree that the time has now arrived when its adoption should be universal, except in the case of quite small undertakings, which do not lend themselves to such accurate working as is contemplated by the Gas Regulation Act, and where the expense of installing extensive testing apparatus would tend to increase the cost of gas. We think that the suggestion as to the minimum size of undertakings to be exempted from this suggestion (*i.e.*, those supplying less than 20 million c.ft. per annum) is a reasonable one; and, as it is not opposed by the National Gas Council, we recommend its adoption. The time which has elapsed since the passing of the Act is, we think, sufficient for it to be assumed that any undertakers who require a revision of their standard or maximum price in the manner contemplated by section 1 of the Act will have already applied for such increase, and that in the case of an undertaking which has not applied for power to charge on a thermal basis before the "appointed day" it will be sufficient merely to translate the existing standard or maximum price to an equivalent price per therm. The number of undertakings which will be affected is, we are informed, 127, and they supply approximately $8\frac{3}{4}$ p.ct. of the gas sold by all statutory gas undertakers.

A further proposal put forward by the Board of Trade is that all gas undertakers, including those non-statutory ones on which it is not proposed to confer statutory powers (see Part III. of this Report) should, in future, become subject to the requirements of the Gas Regulation Act as regards the purity and pressure of gas, and that any existing requirement as to the supply of gas of an illuminating or calorific standard might be repealed. The National Gas Council do not offer any objection to this proposal in principle, but ask for some alleviation in the present method of testing, which, if applied rigorously to small undertakings, would result in hardship in that these undertakings do not lend themselves to very accurate working. It has been submitted to us, for example, that the requirement that gas should be supplied free from any trace of sulphuretted hydrogen when tested in accordance with prescriptions made by the Gas Referees under the Gas Regulation Act would operate hardly on these undertakings, and that some alleviation of the usual prescription should be made in this respect. The Gas-Works Clauses Act, 1871, contemplated that no trace of sulphuretted hydrogen should be present when tested in the manner provided by that Act; and we should regard any amendment of this provision as a retrograde step. Nevertheless we suggest that if any alleviation is possible in regard to the method of testing prescribed by the Gas Referees consistent with the retention of existing principles, representation should be made to the Referees to exercise a discretionary power in this respect.

Subject to these reservations, we recommend the adoption of the suggestion that all gas undertakers be required in future to conform to the requirements of the Gas Regulation Act as regards the purity and pressure of their gas; it being assumed in the case of non-statutory undertakings that no penalty would be incurred where a deficiency or failure was due to circumstances not within their control. There are at present some 58 statutory undertakings supplying less than 20 million c.ft. per annum, and not supplying on a thermal basis. Many of these are at present required to work under an illuminating standard which is admittedly of no use for present-day requirements, and, in practice, their gas is not tested. We see no objection to the repeal of these illuminating standards if the

purity and pressure requirements of the Gas Regulation Act are applied.

III.—PROPOSALS OF THE BOARD OF TRADE FOR CONFERRING STATUTORY POWERS ON CERTAIN NON-STATUTORY UNDERTAKERS.

Coupled with the suggested extension of the thermal system of charging for gas, the Board of Trade propose that the time has now arrived when certain of the larger of those undertakings which are not at present carried on under statutory powers and are not subject to any statutory restrictions should be given such powers, become subject to the provisions of the Gas-Works Clauses Acts in regard to an obligation to supply gas, be required to supply gas on a thermal basis, and become subject to the purity and pressure requirements of the Gas Regulation Act.

A table is attached indicating approximately the number of non-statutory gas undertakings in existence to-day, classified according to their make of gas. The Board of Trade suggest that their proposal should apply to those undertakings supplying over 20 million c.ft. of gas per annum; and it will be seen that 114 undertakings would be affected out of a total of 578.

The National Gas Council are not opposed to the conferring of statutory powers on these undertakings, and are disposed to agree that they should be subjected to what may be termed technical restrictions (*i.e.*, in regard to the supply of gas of a specified quality, purity, and pressure); but they are opposed to control over the financial operations of these undertakings, as they fear that the raising of capital, which is already sufficiently difficult, would be made impossible if the normal requirements as to the issue of the capital and the limitation of dividends were imposed.

We are inclined to the opinion that the imposition of the usual requirements governing the raising of capital and payment of dividends by statutory gas undertakers might be arduous if applied to these undertakings, but at the same time we are unable to visualize the possibility of creating two classes of statutory undertakings not subject to the same general obligations; and we think that if statutory powers are to be granted, it is essential that prices and dividends should be regulated in all cases, as well as the quality, purity, and pressure of the gas supplied. We think, however, that in determining the conditions which are to govern each particular undertaking, regard should be had by the Board of Trade to the necessity for permitting the raising of capital on the most advantageous terms. To meet, as far as possible, cases of hardship which might arise among certain of the smaller undertakings, we suggest that the conferring of statutory powers should not be imposed against the wishes of an undertaking whose sale does not exceed 30 million c.ft. a year, and in the case of those supplying over 20 million c.ft. but not over 30 million c.ft. per annum a power be conferred on the Board of Trade to grant statutory powers on the application of any local authority having jurisdiction in the area of supply where such authority can show that a satisfactory and sufficient supply of gas is not being maintained.

If this suggestion is adopted, the number of undertakings to be made statutory would be reduced to 61, and a further 53 would be in the position that the local authority of their district could apply for them to be made statutory.

IV.—AMENDMENT OF THE GAS REGULATION ACT AND OTHER GENERAL ACTS APPLICABLE TO STATUTORY GAS UNDERTAKERS.

(1) *Gas Regulation Act.*

Certain of the proposals discussed in the earlier part of this Report will, if given effect to, necessitate amendments to the Gas Regulation Act; and the Board of Trade and the National Gas Council have at the same time submitted that the administration of this Act since 1920 has shown that there are a number of other matters which require amendment in the light of experience gained since the passing of the Act. We have examined the proposals put forward. They appear to us to be desirable; and we consider that opportunity should be taken to amend the following sections of the Act. No serious objection is taken to these amendments by any of the parties who, so far as we have been able to tell, would be affected by them:

Section 1.—Under sub-section (3) of this section the Board of Trade are required to fix standard or maximum prices per therm corresponding as nearly as may be to those provisions per 1000 c.ft. which are applicable to the undertakings in question, making such addition as appears to the Board to be reasonably required to meet the increased costs of producing and supplying gas since 1914, which have occurred through circumstances beyond the control of the undertakers. The proviso to that sub-section permits the Board of Trade from time to time to revise the standard or maximum prices per therm on the application of local authorities, or the undertakers themselves, according to the extent to which it can be shown that costs have altered since the original Orders were made.

It has been represented to us that this method of adjustment of price to meet post-war conditions fails to take into account such factors as increased sales of gas, cost of obtaining capital, and cost of plant and other capital works. We are of opinion that it was not the intention of the Gas Regulation Act that the assistance to be given to undertakers by increasing their standard or maximum prices should operate in a manner prejudicial to the interests of an undertaking which has shown improved working or increased sales, as against an undertaking whose conditions have not improved, nor that the costs of raising capital to meet statutory obligations and to improve and extend the undertaking should act against a company's power of paying a pre-war dividend. We recommend that steps be taken to amend this section of the Act so as to make it clear that an Order under the section shall not deprive an undertaking from benefits to which they would be entitled by reason of improved working or increased business.

Sub-section (7) of this section of the Act defines the calorific value of gas, for the purposes of the Act, as relating to a unit volume saturated with water vapour. We are informed that, with a view to meeting troubles experienced from water depositions in mains, services, and meters, it is becoming a practice among certain undertakings to supply artificially dried gas. In these cases, to comply with the Act, it is necessary for examiners to re-saturate the gas actually tested. We understand that the Gas Referees would find no difficulty in prescribing a means of testing artificially dried gas; and inasmuch as it is desirable that the commodity should be tested in the form in which it is supplied for use, we are of opinion that the Act should be amended to permit the Referees to prescribe a means of testing gas in the form in which it is sent out to consumers.

Section 4.—We are informed that in connection with the operation of this section doubts have arisen as to whether a county council have, under the section, power to appoint a gas examiner for the area within the limits of supply of a local authority owning a gas undertaking, irrespective of whether or not the consent of that local authority is forthcoming. We agree that it should be made clear that this can be done except in the case of an undertaking owned by the council of a county borough over which the county council would normally have no jurisdiction. We think it should also be made clear that reports of gas examiners appointed under the section relate only to that portion of the area of supply which is covered by the appointing authority. Another point which should be made clear is that, where no gas examiner is appointed by the local authority, and it is open, under sub-section (4) of the section, for Quarter Sessions to make the appointment, Quarter Sessions for the area in which the applicant for the appointment of an examiner resides should make the appointment.

Section 6.—We understand that the period of seven days, provided in sub-section (2) of this section, within which undertakers are permitted to appeal to the Chief Gas Examiner against a gas examiner's report, has proved too short. We are disposed to agree with this view, and so long as a definite period of appeal is provided would see no objection to extending the period to 14 or even 21 days if the Board of Trade see fit.

Section 7.—Sub-section (3) of this section provides that undertakings working on the thermal basis shall contribute each year to the Gas Fund which was established under the Act for payment of the expenses of the administration of the Act. If our recommendations with regard to the extension of the thermal method of charge are adopted, an amendment to this section will be required, to provide that all undertakings working on the thermal system, and not merely those in respect of which an Order has been made by the Board of Trade under section 1 of the Act, shall contribute to the Gas Fund. The Board of Trade also suggest, and the National Gas Council support the suggestion, that contributions to the fund should in future be assessed on the number of therms sold, and not according to the number of thousand cubic feet. This method of calculation appears to us a more correct one; and we recommend its adoption, and the substitution of a maximum rate of contribution of "three shillings for each 5000 therms sold" for the present maximum of "three shillings for each million c.ft. of gas sold." We also think that the suggestion of the Board of Trade should be adopted that undertakers operating on a 1000 c.ft. basis should contribute to the Gas Fund at one-half the rate applicable to other undertakings; the quantity of gas sold being converted into therms at 500 B.Th.U. per c.ft. This suggestion is not opposed by the National Gas Council.

Section 9.—Under sub-section (1) of this section it is necessary for a gas examiner to perform a second test after an interval of one hour in cases where a test reveals a deficiency of calorific value amounting to more than 5 p.ct. We are informed that this requirement leads to difficulty where the first test is made late in the day, in that the second test cannot be completed on the same day, as required by this section. We think that this should be rectified; and we recommend the substitution of the words "if on any occasion" for the words "if on any day" which occur at the commencement of this section, and the

omission of the words " On the same day " from the proviso.

Sub-section (4) of this section, we are informed, has not worked well—(*a*) in that many local authorities restrict the number of tests to be made by examiners appointed by them, with a view to reducing costs; and (*b*) in regard to the requirement that sums determined by the Chief Gas Examiner are in all cases required to be applied to a reduction in the price of gas.

In cases where the number of tests in a quarter is restricted, the ascertained calorific value of gas supplied may be based on only one or two tests, which do not reflect the true history of working in that quarter. Where this occurs an undertaking may be penalized, notwithstanding that throughout the greater part of the quarter the declared calorific value has been maintained. We recommend the adoption of the suggestion of the Board of Trade, supported by the National Gas Council, that no quarterly average be assessed unless a minimum number of six tests has been made during the quarter.

In regard to (*b*) we are informed that experience has shown that, in those cases where an average quarterly deficiency has occurred, the amount ascertained as due to consumers has been so small that a refund by means of a reduction in the price of gas has been impracticable. In these cases it has been necessary for the undertaking to carry forward the amount as a liability in their balance-sheet from year to year until such time as a further deficiency is incurred to an extent sufficient to make a refund to consumers a practicable proposition. We suggest that this section of the Act should be amended so as to provide :

(i.) That where the deficiency amounts to the equivalent of 0·2d. per therm, or a multiple thereof, on the quantity of gas sold in the quarter next following the determination of the Chief Gas Examiner, a corresponding rebate to be made to consumers in that quarter; in the case of an undertaking operating a two-part tariff system of charge such rebate to be made on the " commodity " portion of the charge;

(ii.) That any sum left over which cannot be dealt with in this manner, or any sum which does not amount to 0·2d. per therm on the quantity of gas sold in that quarter, should be paid to the Gas Fund with the contribution due for the following year. The principle of returning to consumers the amounts which they have been overcharged will thus be maintained in all cases where it is practicable to do so, and gas consumers generally will benefit by the balances paid to the Gas Fund. The obligation to show the amount of the deficiency in the accounts for the year in which it occurs would, we assume, be retained.

Section 10.—Sub-section (1) of this section of the Act provides that the Board of Trade may, by Special Order, grant any of the powers which, prior to the passing of the Gas Regulation Act, could be obtained by means of a Provisional Order under the Gas and Water Works Facilities Act, 1870. Sub-section (2) of this section sets out certain additional matters which may be dealt with in any such Special Order. We are informed that doubts have arisen as to whether the Board of Trade can under this section entertain an application for an Order unless, in the first instance, it is one, *prima facie*, which could have been submitted under the Facilities Act. We agree with the suggestion of the Board of Trade, which is supported by the National Gas Council, that the position should be made clear, and that they should have power to grant minor incidental provisions commonly granted to gas undertakers, notwithstanding that the Order applied for does not at the same time deal with any of the matters specifically mentioned in the Facilities Act or in sub-section (2) of section 10. We also recommend the adoption of the suggestion that the section can with advantage be extended to enable the Board of Trade, by Special Order, to deal with the following matters, in regard to which powers can, we understand, at the present moment, be obtained only by the promotion of a Private Bill

(i.) The conferring of powers on gas and water and/or gas and electricity companies in cases where powers cannot be given in regard to gas without affecting the water and/or electricity section of the undertaking.

(ii.) The repeal of the powers of supply in a particular district if another undertaking is able and willing to afford a supply in that district, and the undertaking having statutory powers has not afforded a supply within five years of obtaining powers.

(iii.) The power to authorize the establishment of a gas-works by an undertaking outside its statutory area.

(iv.) The power to consolidate the existing enactments of an undertaking.

In regard to (i.), we would see no objection to extending the powers of the Board of Trade to enable them to confer the powers by Departmental Order.

The Gas-Works Clauses Acts.

The National Gas Council suggest that, in promoting the contemplated legislation to deal with the matters referred to in their Memorandum,* opportunity might be taken for adding to the clauses which may be incorporated in Acts and Orders relating to gas undertakings certain provisions which are commonly granted in Private Bills and Special Orders of particular undertakings on the application of those undertakings. The matters to which they refer are set out in detail in the National Gas Council's Memorandum and could, we think, with advantage be incorporated in any revision of the Gas-Works Clauses Acts; but, inasmuch as these Acts are adoptive only, we are disposed to support the view put forward by the Board of Trade that a revision of the Gas-Works Clauses Acts, while very desirable, is not a suitable matter for incorporation in the Bill to be promoted by the Board of Trade, and that representations in this matter should be made to the responsible Parliamentary Authorities.

This general recommendation, however, does not apply to the amendment of existing provisions of the Clauses Acts of 1847 and 1871; and we recommend the adoption of a suggestion put forward by the Board of Trade that section 11 of the Gas-Works Clauses Act, 1871, which sets out the conditions under which statutory gas undertakers are required to afford a supply of gas, should be amended in its present and future application to obviate the possibility of a prospective gas consumer being arbitrarily refused a supply of gas on the ground that his premises are situate beyond the specified distance from existing mains (*i.e.*, 25 yards). The Board of Trade suggest that in such cases a right should be afforded to appeal to an arbitrator who should determine whether or not the demand for a supply is reasonable, and, if so, the terms on which it should be afforded. The National Gas Council do not oppose this suggestion in principle; it being understood that any conditions of supply will be financially fair as between the consumer and the undertaking, and that due regard will be had to ability to afford supply, having regard to the size of existing mains, and also that the giving of a supply will not be prejudicial to the interests of the existing consumers.

In connection with the consideration of the Gas-Works Clauses Acts, the Board of Trade also suggest that the question of the supply of gas by means of prepayment meters requires consideration. Under section 14 of the Gas-Works Clauses Act, 1871, undertakers are required to provide a meter if security is given for the price or rent thereof as the case may be. The view submitted to us by the National Gas Council is that this requirement imposes an obligation to supply an " ordinary " meter if called for and the requisite security is forthcoming. We are informed on the other hand that, from time to time, cases come before the Board of Trade in which consumers complain that they are required, against their will, to accept a supply through a prepayment meter, and to pay the higher charge for costs of collection, &c., usually made for gas supplied through such a meter. The supply of gas through prepayment meters is recognized as being a convenience to certain classes of consumers who might find difficulty in providing the requisite security or paying for the necessary fittings; but we agree with the view of the Board of Trade that every consumer should, in the first instance, have a right to determine the kind of meter to be used by him if he is prepared to provide the security required on electing to take an ordinary meter—it being understood, of course, that this right should not be extended so as to enable consumers unreasonably to demand a change of meter unless they are prepared to pay the cost of such change. In connection with this subject the Board of Trade also suggest that opportunity should be taken for requiring gas undertakers, when collecting money from prepayment meters, to supply consumers with particulars of the amount extracted, a statement of the meter reading, and a statement of the price which is being charged for the gas, as distinct from the additional charge for costs of collection, hire of fittings, &c. The National Gas Council do not look with favour on the suggestion of legislation to deal with this matter, and submit that the practice suggested is already largely in operation. The matter appears to us, however, to be one requiring attention. We understand that it is common practice among gas undertakers to arrange for rebates to be made to prepayment consumers when the price of gas falls, instead of effecting constant adjustments to the prepayment mechanism of the meter. We are of opinion in these circumstances that it is necessary as a safeguard to the undertaking and its consumers that collectors should be required to supply details of the amounts collected and of the rebates, if any, due. We accordingly recommend the adoption of the Board of Trade suggestion in this matter.

Sale of Gas Acts, 1859 and 1860.

The provisions of these Acts regulate the methods of testing gas meters and the manner of appointment of gas meter inspectors. The Acts were amended in certain respects by the Gas Regulation Act, 1920, but we are informed that these amendments were insufficient to bring the Acts into line with present-day needs, and that existing legislation regarding the testing of meters is now difficult to interpret, and in certain

* This Memorandum was published in the " JOURNAL " for Oct. 6, 1926, p. 25.

respects practically impossible to comply with. We agree in these circumstances with the suggestion of the National Gas Council, which is supported by the Board of Trade, that opportunity should be taken for repealing the existing legislation dealing with this matter, and for setting out afresh the powers and duties of local authorities in regard to the appointment of gas meter inspectors, the establishment of meter testing stations, and the duties of inspectors in regard to the methods to be employed for testing and certifying meters.

Electric Lighting (Scotland) Act, 1890.

Under this Act local authorities owning electricity undertakings in respect of which deficiencies of income are incurred are required to charge those deficiencies on the local rate, so far as they cannot be met out of reserves, and for the purposes of the Act, "Local rate" is defined as "The Gas Rates leviable and gas rents and other revenues recoverable under the general or local Act." Cases are cited in the National Gas Council's Memorandum where considerable sums have been applied from gas revenues in certain cases to make good losses on electricity undertakings, thereby placing an unfair burden upon a particular class of the community. We agree that the conditions under which gas and electricity are supplied have altered since 1890, and that steps should now be taken to prevent losses incurred on an electricity undertaking becoming a burden on gas consumers.

Local Government (Scotland) Act, 1894.

We are informed that, owing to the inappropriate wording of section 44 of this Act, it has been found impossible for County Councils, as distinct from District Committees of a County Council, to adopt the Burghs Gas Supply (Scotland) Acts, and to establish gas undertakings within a county area in Scotland. The defect was remedied in the case of the Lanarkshire County Council by a Provisional Order obtained in 1914; and we see no objection to the adoption of the suggestion.

Miscellaneous.

The National Gas Council point out in their Memorandum that it has been customary, when granting to undertakers the power to work up and convert residual products arising from the manufacture of gas, to permit the use of their residuals plant in working up residuals purchased from other undertakers and elsewhere, so long as the quantity of residuals so purchased in any year does not exceed one-third of the like residuals obtained from their own manufacture of gas. It is submitted that this restriction is prejudicial to the economic working of plant in that it prevents its utilization to the full extent, and the industry ask for the removal of the restriction as to quantity where it exists. The Association of British Chemical Manufacturers, who were consulted by us in connection with this proposal, state that they are not opposed to it. We see no objection to the proposal.

A further matter referred to by the National Gas Council concerns the question of the payment of capital duty by gas undertakers in cases of purchase of, or amalgamation with, another undertaking, in regard to which the industry urge that, as capital duty has already been paid by a purchased undertaking on its original capital, a purchasing undertaking should be relieved from paying duty on increased capital spent by it in acquiring another undertaking. Since this proposal was put forward, the Finance Act, 1927, has been passed; and we understand that section 55 of that Act affords all the relief for which the Council now desire to press.

Though not part of their original memorandum of proposals, the National Gas Council have also suggested, in a supplementary statement, that steps should be taken to establish gas stocks as recognized securities in which trustees are authorized by law to invest money. While we appreciate that it might be of advantage to the gas industry if gas stocks were so recognized, a Bill relating to gas legislation is not a suitable place to deal with the matter. Further, we would point out that trustee stocks are established primarily as a means of protection for trust money; and the benefit which might accrue to the gas industry if gas stocks were made recognized trustee investments does not in itself constitute a sufficient reason for the recognition of such stocks.

In the course of our inquiry we were approached by the National Association of Coke and By-Product Plant Owners, who were desirous of appearing before us for the purpose of urging that legislation should be promoted to require gas undertakers to purchase coke oven gas where supplies were available, rather than extend their own gas-producing plant. Though not clearly within our terms of reference, we agreed to hear representatives of the Coke Oven Owners' Association, and at the same time we heard representations in the matter on behalf of the gas industry, who submitted that no case for such compulsion existed. As a result of the evidence put before us, we came to the conclusion that the view of the National Gas Council was the right one, and we informed the Coke Oven Owners that we should have hesitation in suggesting that gas undertakers should be compelled to purchase coke oven gas in that it had not been shown to us that there had been any disinclination on their part to do so in cases where the supply had been offered on suitable terms coupled with satisfactory guarantees as to continuity of supply. We suggested that the matter was one which could be more suitably dealt with if representatives of the two industries were to meet and to agree to terms under which each could be of assistance to the other. We are pleased to report that we have since been informed that a Joint Standing Committee has been constituted consisting of representatives of the two industries; and it is hoped that this body will be successful in dealing with any points of difficulty which arise.

We desire, in submitting this Report, to state that we have been impressed by the representations of the National Gas Council that the industry should be freed at the earliest possible moment from irksome restrictions; and we would urge, accordingly, that steps be taken without delay to promote legislation to give effect to the recommendations we make.

We desire to express our gratitude for the valuable assistance we have received from our Secretary, Mr. D. Haigh. His work has been extremely difficult, but it has been most excellently performed.

(Signed) FRANK HODGES (*Chairman*).
JOHN BAKER.
ARTHUR DUCKHAM.
M. MANNABERG.
ALEX. WALKER.

D. HAIGH,
Secretary to Sub-Committee.
Aug. 11, 1928.

TABLE.

Non Statutory Undertakings Classified according to Make of Gas.

—	Total Number of Undertakings.	Number of Undertakings Supplying				
		Up to 20 Million C.Ft.	20-30 Million C.Ft.	30-40 Million C.Ft.	40-100 Million C.Ft.	Over 100 Million C.Ft.
England and Wales .	413	347	31	16	15	4
Scotland	165	117*	22	5	15	6†
	578	464	53	21	30	10

* Including two undertakings owned by local authorities.
† Including one undertaking owned by a local authority.

PROPOSALS BY THE BOARD OF TRADE WITH REGARD TO THE AMENDMENT OF EXISTING GAS LEGISLATION.

(1) *Statutory Gas Undertakings (unless specifically exempted) to be required to charge for Gas according to the Number of Thermal Units the Gas contains.*

In June, 1917, the Fuel Research Board were asked by the Board of Trade to advise as to "What is the most suitable composition and quality of gas and the minimum pressure at which it should be generally supplied, having regard to the desirability of economy in the use of coal, the adequate recovery of bye-products, and the purposes for which gas is now used." The Fuel Research Board reported in January, 1919, to the effect that gas undertakings should be freed from the requirement to supply gas of a particular illuminating or calorific value, but should in future charge for gas only according to the number of thermal units in the gas passing through the consumer's meter, that the gas should be free from any trace of sulphuretted hydrogen, and be supplied at a pressure of not less than 2 in. of water at the exit of the meter. The Gas Regulation Act, 1920, was based upon this report, and section 1 (1) of the Act provides that "The Board of Trade may on the application of any gas undertakers by Order provide for the repeal of any enactments or other provisions requiring the undertakers to supply gas of any particular illuminating or calorific value and for substituting power to charge for thermal units supplied in the form of gas." The section goes on to provide for the translation of the maximum and standard prices per 1000 c.ft. of gas into prices per therm (100,000 B.Th.U.), and for an addition to such prices to meet the increased cost of making and supplying gas since June, 1914. Then, in section 1 (5) it is provided that "if within two years after the passing of this Act any undertakers have not applied to the Board of Trade for an Order under this section, the Board of Trade may, after giving not less than three months' notice to the undertakers, make an Order applying to those undertakings which shall have the same effect as an Order made on the application of the undertakers."

At the present time out of 779 statutory gas undertakings in Great Britain 208 have not yet applied for power to supply gas on a thermal basis. Of these, 53 belong to companies and 155 to local authorities, and these figures compare with 409 companies and 162 local authorities already supplying gas on the thermal basis. It will thus be seen that, while the great majority of the statutory gas companies have adopted the thermal basis, only one-half of the local authorities owning gas undertakings have so done. In view particularly of the obvious disinclination of the local authorities (including some of the largest, such as Birmingham, Birkenhead, Huddersfield, &c.) to adopt the new

basis of charge, the Board have not thought it desirable to exercise their power under section 1 (5) of the Act to make compulsory Orders in individual cases, although from the experience of the last 5 years they are convinced that, excepting in the case of small undertakings, it is greatly to the advantage of the gas industry and the gas consumers that gas should be supplied on this basis. This view is supported by that of the Departmental Committee on the "Method of Charging for Gas on a Thermal Basis," which recommended in February, 1923, that "The method of charging for gas on the thermal basis should be continued and extended to all statutory gas undertakings within the scope of the Gas Regulation Act." It is, therefore, suggested that advantage be taken in future legislation to provide that all the remaining statutory gas undertakings (except such small undertakings supplying less gas than, for instance, 20 million c.ft. per annum as may be exempted by the Board of Trade after application by the undertaking) shall, as from an appointed day, supply gas on the thermal basis and become subject to the provisions of the Gas Regulation Act as to testing, &c. The individual Orders arranged for by the Gas Regulation Act cannot now be regarded as essential, for it may be assumed that any undertaking which requires an addition to its maximum or standard price will have applied for an Order during the last 6 years.

(2) *Exempted Statutory Undertakings.*

Of the (say) 60 small statutory gas undertakings which may be exempted from the thermal basis under these proposals, several have in their particular Acts or Orders provision for revision of the maximum price by order of the Board of Trade.

It is suggested that these undertakings, though exempted from the requirement to supply gas on the thermal basis, should become subject to the provisions of the Gas Regulation Act with regard to purity and pressure, but should not be required to maintain an illuminating or calorific standard, any such existing standard being repealed. It is unlikely that the position so created would be abused, but consideration might possibly be given to the provision of means whereby cases of unreasonably low calorific value could be prevented. Provision should be made enabling the local authority to appoint a gas examiner to test the gas for purity and pressure and to enable the Board of Trade to make an Order requiring the undertaking to adopt the thermal basis as soon as they are satisfied that the sale of gas exceeds (say) 20 million c.ft. per annum. It is suggested that the Board should take power to revise, on the application of the undertakers or of the local authority, by Departmental Order the maximum price (per 1000 c.ft.) of exempted undertakings where that power does not already exist.

(3) *Non-Statutory Undertakings.*

There are about 600 non-statutory undertakings in Great Britain, and these undertakings differ from the statutory ones in that—

(i.) They have no statutory power to open roads for the purpose of laying or repairing their gas mains or service pipes, and can operate only with the actual or tacit consent of the local authority. (It is extremely rare for such consent once given to be revoked, but the continuance of an undertaking as a non-statutory one depends largely on the maintenance of good relations with the local authority).

(ii.) They are prohibited by the Gas Regulation Act, 1920, from supplying gas on the thermal basis.

(iii.) They are under no obligation to give or continue to give a supply of gas.

(iv.) They are under no statutory restrictions as to—

(*a*) the extent of their area of supply;

(*b*) the lands on which they may manufacture gas or residuals products, or which they may acquire for other purposes of their undertaking;

(*c*) their share capital and borrowing powers;

(*d*) their dividends;

(*e*) the price of gas;

(*f*) the purity and pressure of their gas.

From time to time the Board of Trade receive complaints as to the supply given by these undertakings, but generally they perform a useful function, and, being in the majority of cases quite small, probably could not bear the restrictions placed upon statutory undertakings.

The National Gas Council ask, in their Memorandum, for the establishment of an inexpensive and simple procedure whereby these undertakings can acquire statutory powers. Such a procedure, together with a simple method of obtaining power to raise additional capital, would no doubt encourage a number of them to obtain powers. To meet these points, it is suggested that—

(1) The larger non-statutory undertakings—*i.e.*, those supplying over (say) 20 million c.ft. per annum—should be required to become statutory and to adopt the thermal basis. Provision for this to take place as from an appointed day could be made in the future legislation (as regards i., ii., iii., and iv. (*f*) above), it being left to the Board to deal by Departmental Order with the matters referred to in iv. (*a*) to (*e*) above in regard to individual undertakings.

(2) Non-statutory undertakings under (say) 20 million c.ft. should be given the option of becoming statutory on the appointed day with the larger ones if they so desire, but without the compulsion to adopt the thermal basis or compulsory restriction of their share capital and borrowing powers, dividends, or price of gas (iv. (*c*) to (*e*)). The Board of Trade should be empowered to make a Departmental Order requiring the undertaking to adopt the thermal basis, and imposing the restrictions iv. (*c*) to (*e*) as soon as they are satisfied that the sale of gas exceeds (say) 20 million c.ft. per annum.

(3) Non-statutory undertakings under (say) 20 million c.ft. which do not accept the opportunity to become statutory should be required to become so on reaching a sale of (say) 20 million c.ft. per annum, and meanwhile their consumers should be protected as to the purity and pressure of the gas supplied—*i.e.*, the undertaking should be required to maintain the minimum pressure required by the Gas Regulation Act (except where, in proper cases, the Board of Trade allow a relaxation of that minimum), and to supply gas free from sulphuretted hydrogen.

(4) *Appointment of Gas Examiners.*

Provisions as to the appointment of gas examiners to test the gas supplied are contained in section 4 (3) and (4) of the Gas Regulation Act. The object of these provisions is to provide for the efficient testing of gas (which is, in existing circumstances, necessary to ensure that the consumer gets "full measure" under the thermal basis of charge) without casting an undue charge on the local authority. The provisions as to joint appointment have on the whole worked well.

There is, however, doubt whether a county council have, under these provisions, power to appoint, either with or without the consent of the relevant undertaking, a gas examiner for the area within the limits of supply of a local authority which owns a gas undertaking. It is suggested that it should be made clear that this can be done except in those cases where the owning local authority is the council of a county borough over which the county council have no jurisdiction.

Friction has arisen in some cases where one local authority has appointed a gas examiner and other authorities refuse to do so or to join in a joint appointment. It should be made clear that in such cases the report of the examiner shall be deemed to apply only to the area of the local authority by which he is appointed, and that any determination by the Chief Gas Examiner under section 9 (4) of the Act (or of that sub-section as amended) shall only apply in respect of gas supplied within the area of the appointing authority, the Chief Gas Examiner being empowered to determine the number of therms supplied during the quarter in question within that area.

As regards section 4 (4) of the Act, it has been suggested that the Quarter Sessions referred to is the court proper to the gas-works rather than to the district supplied—*e.g.*, if the gas-works happened to be in Lancashire, consumers living in Yorkshire would have to apply to a Lancashire Quarter Sessions. If this view is correct, it should be made clear that the Quarter Sessions would be that for the county in which the applicants live.

(5) *Appeals to the Chief Gas Examiner.*

It has been found in practice that the period of 7 days prescribed by section 6 (2) of the Gas Regulation Act within which gas undertakers may appeal to the Chief Gas Examiner is too short, and it is suggested that the period should be extended to 14 days. At the same time section 9 (*b*) should be amended so that proceedings may be commenced only after the expiration of the appeal period.

(6) *Gas Fund.*

An amendment to section 7 of the Gas Regulation Act may be required in order to provide that all statutory undertakings working on the thermal basis shall be required to contribute to the Gas Fund, and it is suggested that, if it is decided that other gas undertakings, whether statutory or not, are to be subject to the provisions of the Gas Regulation Act as to purity and pressure, they should be required to contribute to the Gas Fund at a rate not exceeding one-half that to which the undertakers working on the thermal basis are liable.

It should also be provided that undertakings working on the thermal basis should in future be assessed on the number of therms sold during the preceding year (calculated at the declared calorific value) and that, in the case of undertakings not working on that basis, the contribution should be based on the number of million cubic feet sold in the preceding year converted into therms at the rate of 500 B.Th.U. per cubic foot.

The maximum contribution should be altered to 3s. per 5000 therms sold—*i.e.*, a conversion of the existing maximum contribution at the rate of 500 B.Th.U. per cubic foot.

Difficulty has arisen as to the expression "the preceding year" in sub-section (3) of section 7 in the case of Scottish undertakings, and it is suggested that in their case the preceding year should be that ending on the Scottish quarter day next before Dec. 31—*i.e.*, Martinmas or Nov. 11.

(7) *Forfeitures for Deficient Calorific Values, &c.*

It is suggested that sub-section (1) of section 9 of the Gas Regulation Act requires amendment to provide that, if the first testing is not finished until after 11 p.m. and another testing is necessary under the proviso to that sub-section, the second testing should be made one hour after the first testing is finished notwithstanding that it is after midnight.

Sub-section (4) of section 9 of the Gas Regulation Act has not worked well in practice owing to the small amount of the deficiency in the majority of the cases which have arisen. It is suggested that as a deficiency results in a consumer getting short measure for his money, the gas undertaking should be required to return to the actual consumer, as a rebate, a sum of money equivalent to the value of the heat units for which he has been charged, yet has not received. Some difficulty may be found in dividing the amount represented by the deficiency among the consumers, and it is suggested that no payment should be made to the consumer which is not a penny or a multiple of a penny, and that any balance of the amount which is indivisible, and any rebate which cannot be paid to the actual consumer who received short measure should be paid into the Gas Fund. It should be the duty of the auditor to certify on the accounts that the rebate has been returned to the consumers, and the balance, if any, has been paid into the Gas Fund.

(8) *Departmental Orders.*

Proposals are made in the earlier part of this Memorandum or in the

National Gas Council Memorandum that the Board of Trade should be enabled by Departmental Order—

(1) To revise the maximum price per 1000 c.ft. of those existing statutory gas undertakings which are not required to supply gas on the thermal basis;

(2) To make the detailed provisions required in the case of those non-statutory undertakings which are given statutory powers by general legislation;

(3) To make similar provisions in the case of those non-statutory undertakings which are required to become statutory on attaining a consumption of 20 million c.ft.;

(4) To make exceptions to the pressure requirements of the Gas Regulation Act in the case of individual non-statutory undertakings—*i.e.*, those with a consumption of under 20 million c.ft.;

(5) To substitute, for a maximum price and maximum dividends, a standard price and standard dividends.

In this connection it may be pointed out that under section 1 of the Gas Regulation Act the Board are empowered by Departmental Order to revise maximum or standard prices in accordance with the provisions of that section, and that in numerous cases provision is made, in Special Acts and Orders, for the Board to alter maximum prices and to substitute standard for maximum prices by Departmental Order. Likewise the Board are authorized by section 1 of the Gas Regulation Act to vary, in proper cases, the requirements of that Act with regard to pressure.

If the suggestions relating to certain non-statutory undertakings are approved, and such companies are required to become statutory either by the operation of general legislation on an appointed day or on attaining an annual sale of 20 million c.ft. the necessary detailed powers and restrictions should, because of the number of orders which would be involved, be dealt with on the normal lines, but by Departmental Order.

(9) *Special Orders.*

It is suggested that the Board's powers under section 10 of the Gas Regulation Act should be amended as follows:

(1) Where Parliamentary Gas Companies supply water and/or electricity as well as gas, and the undertakings are not completely separate, the Board should have power to authorize the charging of loan capital on the whole undertaking, and also to include in a Special Order other provisions relating to the gas undertaking which also unavoidably affect in a measure the water or electricity undertaking—*e.g.*, matters with regard to accounts, directors, interim dividends, auditors, &c.

(2) In cases where authorized undertakers are not affording a supply, or an adequate supply, of gas in any part of their limits of supply over which they have had statutory rights for more than five years, the Board should be given power, if they think fit, to repeal the powers of the existing undertakers, and to authorize another company, local authority, or person to supply gas in the area in question.

(3) In some cases it is desirable that gas-works should be established on a site outside the limits of supply, and the Board should have power to authorize this even though the proposed site is within the limits of supply of other undertakers.

(4) It should be made clear that the Board have power to give minor powers commonly granted to gas undertakers notwithstanding that application is not made for any of the specific provisions mentioned in the Gas and Water Works Facilities Acts or the Gas Regulation Act which are included in the Special Order.

(5) The Board should have power to consolidate the Special Acts and Orders of gas undertakings. This power is very desirable in view of the anticipated amalgamations of undertakings.

(10) *Obligation to Supply Gas.*

Under section 11 of the Gas-Works Clauses Act, 1871, practically all gas undertakers are under an obligation to give, and to continue to give, a supply of gas to any premises within 25 yards of one of their mains on the conditions specified in that section. Many cases have arisen lately where complaint has been made that a gas undertaking has refused to extend its mains to supply new building estates and housing schemes, and the owners of the houses in question have no appeal against this refusal. It is suggested that an appeal should be provided so that complainants would not be met by a blank refusal, but would be able to hear and criticize the case of the undertaking before an arbitrator. The arbitrator should have power to define the conditions under which an extension of main is to be made, provided that such conditions shall be financially fair and reasonable. Gas undertakings have recently obtained a clause in many Acts and Orders releasing them, where the size of their mains is insufficient, from the obligation to supply except on terms approved by an arbitrator, and, therefore, they should not object to this proposal.

(11) *Ordinary and Prepayment Meter Supplies.*

The question of supplies of gas by prepayment meters appears to require consideration. At present there are no provisions with regard to prepayment meters applying to all gas undertakers. By the Metropolis Gas (Prepayment Meter) Act, 1900, it is provided that the metropolitan companies "shall not charge for gas supplied through a prepayment meter any greater charge rate or rent than the companies are respectively entitled by law to charge for gas supplied to private consumers through any other kind of meter or by any other method of supply." The Act then goes on to provide that—

> The companies shall not charge for the hire of any prepayment meter and fittings to be used therewith any sum other than a sum of money calculated according to the quantity of gas supplied through such prepayment meter, and the maximum sum to be so charged shall be at the rate of *10d. per 1000 c.ft. supplied in manner aforesaid, such sum to include the hire of one meter and the fittings to be used therewith.
>
> The said charge shall include the providing, letting, fixing, repairing, and maintenance of the meter and fittings, and the cost of collection, inspection, and any other cost incurred by the company in connection with the meter and fittings.

The Act then provides for revision of the maximum charge by the Board of Trade, and that the maximum charge for the hire of a prepayment meter without fittings shall be at the rate of 10 p.ct. per annum on the cost of the meter.

Similar provisions (without revision) have been included in the Special Acts and Orders of many other companies and local authorities.

It will be seen that under these provisions the consumer of a small quantity of gas supplied through a prepayment meter in cases where fittings are supplied by the undertaking with the meter may pay a very small amount per annum to cover the costs mentioned in the section quoted, while another consumer using a large quantity of gas may pay much more than is justified by the services rendered by the undertaking. Moreover, there is reason to believe that in some cases certain fittings only are supplied with a prepayment meter, and that if the consumer orders the undertaking to supply, for instance, a gas fire, a further charge for the hire of the fire is made. The use of the gas fire, or for that matter of any fittings at all provided by the consumer himself results in the use of more gas by the consumer for which he pays at the prepayment meter rate.

This matter is complicated by the fact that the consumer has no appeal against a decision by a gas undertaking that he shall take his gas through a prepayment meter, his only remedy being to cease to use gas, which in the case of poor consumers is frequently impracticable.

It is suggested that a gas undertaking should be required to give their consumers the option of using—

(1) An ordinary meter; or

(2) a prepayment meter without fittings; or

(3) a prepayment meter with specified fittings.

In the case of (1) the undertaking has power under sections 11 and 14 of the Gas-Works Clauses Act, 1871, to require security, and this section 14 would also apply in the case of (2). In the case of (3) the consumer should be clearly informed that *all* gas supplied would be charged at the prepayment rate.

Subject to the consumer being given these options the Board suggest that the provisions above referred to should be applied to all gas undertakings, but that in the case of (3) a minimum charge should be allowed.

It may be pointed out that if the two or three part tariff system be introduced, it would be possible to meet many of the difficulties presented by the prepayment meter consumer.

* Altered to a charge per therm in Orders under section 1 of the Gas Regulation Act, 1920.

"PREMIX" GAS AND AIR INCORPORATOR.

The "Premix" gas and air incorporator, manufactured by Premix Gas Plants, Ltd., York Mansions, Petty France, S.W. 1, is the result of many years' research work; the first patents being granted as far back as 1910. The incorporator embodies improvements found, by many years' experience, to be necessary in order to deal scientifically with industrial heating. The old type of piston valve, hitherto used, has been replaced by a slide valve; and greater precision has resulted. Constant periodical attention to the cleaning of the valve is not necessary, and the adjustment of the mixer is rendered more simple. With this new type of valve, it has been found possible to introduce thermostatic control—an essential where utmost precision is required for delicate heating operations.

With the "Premix" gas and air system, air and gas are incorporated in a homogeneous mixture by means of a compressor, and stratification in the pipe line is impossible. The mixture is of unchanging quality; the pressure being automatically kept constant under all changes of demand and conditions. The plant is independent of fluctuations of the town gas pressure, and adjusts itself, without the aid of the human element, to such variable conditions as may arise.

Institution of Chemical Engineers.—On Friday, Jan. 18, in the Institution of Civil Engineers, Prof. J. W. Cobb, C.B.E., B.Sc., F.I.C., Livesey Professor of Coal Gas and Fuel in the University of Leeds, will deliver a lecture on the subject of "The Reactivities of Solid Carbon in Fuel Processes" before the Institution of Chemical Engineers. This forms one of the series of public lectures recently inaugurated by the Institution. In his lecture Prof. Cobb proposes to show, *inter alia*, how the reactivities of solid carbon (whether as coal or coke) in fuel processes arise, both in furnaces and in producer gas and water gas practice; the characteristics and properties of cokes produced under different conditions; the relation between the reaction and the surface exposed; determinations of reactivity; and possibilities of the future. The lecture will be illustrated by lantern slides; and all those interested in the subject are invited to apply for tickets (to admit two) to the Hon. Secretary, Institution of Chemical Engineers, Abbey House, Westminster, S.W. 1. The chair will be taken at 6.30 p.m. by Sir Alexander Gibb, President of the Institution.

WIDEN THE BASIS OF REPRESENTATION.

By "An Informed Observer."

For a good many reasons, chief among them being the increasing pressure of competition and the realization of the fact that, prosperous though its position is just now, the future is full of dangerous possibilities, the attention of thinking men in the gas industry is being keenly concentrated upon the problems with which it is faced. Various though these problems may be in their nature, they are alike in bearing upon the most urgent business with which the industry has to do—viz., a large reduction in the general price of gas.

The way to that desired end is strewn with difficulties which, as one observer sees them, are roughly divisible into the four classes which correspond more or less to the varying type of intellect occupied in the direction and administration of gas undertakings—engineering, legal, financial, and commercial. To a large extent some problems fall into more than one class, and the whole are very closely interwoven; but nevertheless it does appear that so far as their solution is concerned there is reason in such a division as is suggested.

Probably it is to the engineers and chemists of the industry that the rest of the folk concerned look for the greatest contribution to the solution, in the shape of reduced manufacturing and distributing costs. Developments in the carbonizing world have been so rapid of late, and so many eager and talented men have obviously almost succeeded in producing gas with a much greater economy of coal and other manufacturing incidentals, that the possibility of a radical change in the method of manufacture, involving the abandonment of traditional ways, must not be ruled out of our reckoning. In the realm of distribution, too—now a distinct branch, instead of merely a disturbing element in the engineer's calculations—we have apparently discovered, in high-pressure systems and wrapped steel mains, means at once of reducing the capital costs of mains and services, and also of avoiding the necessity for the multiplication of manufacturing stations.

Therefore, in both of the items which, together, are responsible for the largest portion of the expenditure in a gas-works, we may count on the probability of tremendous advances. But, after all, these are primarily matters for technical experts, and it is right that the gas engineers, as a class, should realize the implications of the position. Inventive genius should be encouraged in every possible way, and every fresh idea which seems to bear ever so lightly upon the great problem of increased efficiency at decreased cost should be thoroughly and patiently examined.

The Legal Position.

Legally, gas undertakings are in almost the same position as when, fifty years ago, they were looked upon—with a certain amount of reason, perhaps—as monopolists, against whom the public ought to be protected. The fact is that laws which then had justification in the theoretical necessity for curbing the greed of investors are now merely vexatious, and the increasing development of business is delayed and hindered by the excessive legal costs and cumbrous working of the parliamentary machine. Moreover, these things are rendered inevitable by laws which have outlived their usefulness and have been outgrown by the industry to which they are applied.

Importance of the Financial Aspect.

The financial aspect of gas undertakings—apart altogether from questions of capital—calls, the writer considers, for more attention than it receives. We read but occasionally a paper and discussion upon rating, more seldom still upon taxation: but the general conduct of a gas undertaking upon its accountancy side is scarcely ever the subject of conference. The reason for this is not far to seek; for as a class secretaries and accountants are almost entirely excluded from the counsels of the industry. Yet the problems of rating and taxation are more properly considered by men whose training and experience has fitted them for such tasks, while there are, besides, many points of major and minor importance—concerned, among other things, with gas charges, the sound allocation of expenditure, office administration, collection, &c.—which bear upon economy and efficiency, about which the exchange of opinions and experiences would be of value.

The present position of the industry from the rating point of view, for example, cannot be considered as satisfactory. Disregarding the attitude of the Government towards the right of the industry to a degree of relief from rating, the hypothesis upon which for many years the rating of gas-works has been based has also been the cause of an enormous quantity of litigation, with the inevitable very heavy costs. Even now there is no reason for supposing that two undertakings of similar size, producing approximately the same percentage of profit upon turnover and capital, will be assessed at anything like the same figure. So many things become matter for argument between experts. Hypothesis is built upon hypothesis, and the issue is frequently so confused that, in the end, assessments are settled upon no principle whatever, but on a compromised figure between the opposing sets of expert witnesses. The hypothetical tenant may, or may not, be a moral sort of fellow. We never have an opportunity of judging, nor shall we until the basis upon which his rent is to be calculated is more firmly laid down, and points which, in the hypothetical case would be looked upon as facts, are not treated as matter for argument.

As to taxation, there is certainly less obscurity and fairer treatment, although anomalies still exist, and we find need for a thorough examination of our position. Meanwhile, it is as well to note that the present state of affairs—particularly regarding depreciation, &c.—is the fruit of the action of a Committee upon which gas companies' secretaries and chartered accountants formed the majority.

Much has been said and written concerning graded charges—mainly by engineers. Now it is obvious that every right-minded person in the industry must be desirous of adopting and using any plan or device which shall conduce to its prosperity; but one would wish to submit the view that the opinion and experience of secretaries and accountants as such ought to be helpful. After all, the departments headed by these men are those which present the least attractive side of the industry to the consumers. They are concerned with obtaining his money! A considerable addition to clerical work is inevitable when charges of a varied nature are to be the case. This is all extra cost, and with other incidentals has to be taken into account in any calculation of the benefits to be obtained from a graded tariff.

Again, some standard of consideration ought to be possible on the vexed question of the allocation of costs. This is at present too often determined at the whim of an officer who is vaguely following the view that everything possible should be charged against revenue.

The Development of Sales.

The ultimate success of any business concern, however, is measured by the degree to which its aim has been, and is being, achieved; and in this connection undoubtedly a great portion of the present prosperous condition of gas undertakings generally is attributable to the recent development of the sales side. Gone are the old "take-it-or-leave-it" days; vanished, too, are the autocratic inspector and other officials of our youth. No longer does the gas office occupy an obscure corner of the street adjacent to the works, and rank with rates offices, post offices, and banks in the public mind as places of awe and fear. To-day it vies in grace and attractiveness with the best offices and business establishments. Our salesmen are urged to become philosophers, psychologists, courtiers, and logicians, having, as well as a general knowledge of the processes of gas manufacture and distribution, and the development of gas apparatus designs, a smattering of household economy and cooking knowledge.

In the old days we did not advertise. Now we do—necessarily. But, apart from the efforts of some of the large manufacturing concerns and nearly all the "B.C.G.A." productions, our advertising is in the main ineffective and clumsy. Publicity, to be successful, should make the man in the street realize the indispensable nature of the commodity it advocates; and this is where our posters, placards, and newspaper advertisements just fall short. Be that as it may, however, certainly the elegant showroom, the courteous and intelligent salesman, and effective publicity, are very important parts of our organization. Salesmen's Circles all over the country are seeking to stimulate the enthusiasm of their members; but while a few attempts are being made to co-ordinate ideas and experiences, so far the commercial—that is, the selling—side of the industry is practically unrepresented in its higher councils.

A Suggestion.

The gas industry, in which so much capital is invested, upon which so many depend for their livelihood, and to which the nation may, and does in fact, look for assistance in the great fight for health, beauty, and efficiency, is not, in the writer's opinion, making the best use of the intellectual forces at its disposal. These should be recruited from the ranks, not of one section of its servants, but of all. Engineers, chemists, lawyers, secretaries, accountants, and sales organizers ought to be in a position to contribute of their experience and knowledge by counsel and conference. If the National Gas Council were to open its doors to admit such men, the representatives of all of the many sides of the industry, its title to speak authoritatively would be unquestionable.

GAS BILLS FOR 1929.

(*Continued from p. 95.*)

ROMFORD.

The Romford Gas and Coke Company are promoting a Bill of Incorporation. The Company was formed by a Deed of Settlement dated Feb. 24, 1847, and became a limited Company on Oct. 30, 1874. The total paid-up share capital is £109,850, and premiums amounting to £23,885. In addition, there are debenture bonds to the extent of £66,800. The standard prices of gas are 17d. per therm to consumers within a radius of one mile of the works, and 17·6d. to consumers beyond that area. The standard rates of dividend are 10 p.ct. and 7 p.ct. on the respective classes of shares, with a sliding-scale.

INCORPORATION.

The Bill provides that, as from Jan. 1, 1930, the limited Company shall be dissolved, and shall be incorporated under the name of the Romford Gas Company. All officers and servants in the employ of the limited Company on the appointed day shall continue to hold the same offices and employments on the same terms and conditions.

The capital of the Company will be £350,000, of which £171,775 (called the original capital) shall be substituted for the existing share capital, and £178,225 (called the additional capital) may be raised as provided. On the appointed day, there shall be created £116,850 of ordinary stock, £40,705 of 6 p.ct. preference stock redeemable at par on Jan. 1, 1933, and £14,220 of 5½ p.ct. preference stock. The ordinary stock shall be divided among the registered holders of the ordinary shares of the limited Company in the proportion of £12 10s. of such stock for each original £5 share, and £10 of stock for each "B" £5 share. The 6 p.ct. redeemable preference stock shall be divided among the holders of similar shares of the limited Company, in the proportion of £5 of such stock for each £5 preference share. The 5½ p.ct. preference stock will be allocated in the same way among the holders of the present 5½ p.ct. preference shares. The debenture bonds outstanding at the appointed day will become debenture bonds of the new Company.

The Company may, without further authority, borrow on mortgage of the undertaking in respect of the original capital any sum or sums not exceeding in the whole £85,887. They may also borrow any sum or sums not exceeding in the whole one-half of the additional capital which at the time of borrowing has been raised. Any stock or debenture stock of the Company may be held in amounts of £1, or any multiple of £1, and not otherwise; and the Company shall not be under any obligation to register a transfer of any such stock or debenture stock which would reduce the holding of stock or debenture stock of that class of the transferor below or make the holding of stock or debenture stock of that class of the transferee less than £1 or a multiple of £1.

Meetings will be held yearly. The number of Directors shall be five; but the Company may vary this, provided that the total be not at any time more than nine or less than three. The qualification of a Director shall be the possession in his own right of ordinary stock of the Company to the nominal amount of not less than £400. The Directors may appoint one or more of their body to be Managing Director or Managing Directors.

Lands are scheduled which the Company may use for the purposes of their undertaking. The limits of supply are to be the urban districts of Romford and Hornchurch, and the parishes of Upminster and Noak Hill, in the rural district of Romford.

TO COMPEL REPAIRS OF PIPING OR APPARATUS.

The clause giving power to compel repairs of piping or apparatus, &c., in dangerous condition is in the following terms:

> If the Company shall at any time serve notice upon any consumer to the effect that an officer or servant of the Company has reported, after inspection of any internal piping or gas consuming appliance or fitting on such consumer's premises, that he is of opinion that any such internal piping or gas consuming appliance or fitting is in such a condition as to be dangerous to the occupiers of the premises, such consumer shall forthwith carry out such works as may be necessary to remove the cause of danger. If the consumer shall fail forthwith to carry out such works as aforesaid, the Company may stop the gas from entering the premises of such consumer by cutting-off the service pipe or by such other means as the Company shall think fit. Any expenses lawfully incurred by the Company in cutting-off the gas from such premises may be recovered by the Company summarily as a civil debt.
>
> For the purposes of this section, the Company shall, subject to the provisions of section 21 of the Gas-Works Clauses Act, 1871, have, and may exercise, the like powers of entry as are exercisable under that section.
>
> Nothing in this section shall apply to any internal piping, gas consuming appliance, or fitting on the premises (other than a dwelling-house) of any railway company, nor shall the powers of this section be exercisable in respect of such premises.

BASIC PRICES AND DIVIDEND.

The declared calorific value of the gas is to be 450 B.Th.U., and the basic prices are to be 11d. per therm in the inner area, and 11·6d. in the outer area. If at any time after three years from the appointed day the Board of Trade so decide, these basic prices may be revised. The Company may from time to time charge for gas supplied by them in the outer area a price per therm exceeding by no more than 0·6d. that charged in the inner area. The basic dividend is to be 5 p.ct. on the ordinary stock.

The usual provision is made for the division of profits. The Directors may establish profit-sharing, and issue to employees stock without first offering it for sale by public auction or tender. They may also accept on deposit on behalf of any employee any savings or other sums of money and pay interest thereon out of revenue of the Company, and may set-up a superannuation scheme.

AGREEMENTS WITH OTHER GAS UNDERTAKERS.

There is a clause providing for agreements between the Company and other gas undertakers authorized to supply gas under parliamentary powers in any district adjacent to their limits of supply for any of the following purposes:

> The use or the participation in the use of, or in any benefit of, any premises, plant, organization, operations, or other facilities belonging to, enjoyed by, carried on, or provided wholly or partly by the Company in relation to the manufacture and sale of gas or products arising in such manufacture or the provision of any such facilities.
>
> The purchase, transport, landing, and delivery of coal, and the dispatch or disposal of residual products arising in the manufacture of gas.
>
> The carrying out of scientific research in relation to coal and such residual products as aforesaid.
>
> The extension, provision, and maintenance or use of any laboratories and apparatus for such research, and the use or benefit of any results or discoveries arising thereby.
>
> The provision of any buildings, works, or plant for the purpose of enabling either party to such agreement to give a supply of gas in bulk to the other of them.
>
> The provision of moneys for carrying into effect any such agreement.
>
> Any matters or things incidental to, or connected with, any of the purposes aforesaid.

Succeeding sections stipulate that securities may be taken as a consideration, and loans may be made to other companies, or shares subscribed for. If any person is required by the Company to give to them security for a supply of gas, or for the payment of the price or rent of a meter, and such security is made by way of deposit, the Company shall pay interest at the rate of 5 p.ct. per annum on every sum of 10s. deposited by way of such security for every six months during which the same remains in their hands.

[*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

ROYAL VICTORIA DOCKS APPROACHES.

POWER TO ACQUIRE A BRIDGE OF THE GAS LIGHT AND COKE COMPANY.

In a Bill to empower the London County Council and the Borough of West Ham to carry out works for the improvement of the approaches to the Royal Victoria Dock and other docks of the Port of London Authority, there is a clause to enable either of them to acquire a bridge of the Gas Light and Coke Company carrying the mains of the Company over the River Lee near to, and northward of, Barking Road Bridge, and the mains, pipes, works, and apparatus situate in, or forming part of, the bridge, and all or any of the mains, &c., of the Company at the south-eastern and north-western extremities of the bridge.

At any time after the acquisition of the bridge, and of the mains, pipes, works, and apparatus, the authority may demolish and remove the bridge, and take up the mains, works, &c., and may dispose of the materials. The authority, however, are not to take up or remove any of the mains or pipes until they have provided and laid to the reasonable satisfaction of the Gas Company a main or mains having a carrying capacity not less than that of the main or mains which the authority intend to take up or remove, and shall have connected the main or mains with the mains of the Gas Company which

it is not intended to remove, and provided all other works reasonably necessary.

The authority and the Gas Company may enter into agreements with respect to the acquisition, demolition, and removal of the bridge, mains, &c., and for the substitution of new mains, works, and apparatus.

[*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

SHEFFIELD.

The preamble of a Bill being promoted to consolidate the Sheffield Gas Acts and Orders, 1855 to 1928, states that the existing ordinary capital of the Company consists of £1,736,968 of ordinary stock; and they are authorized to raise additional capital up to the amount of £600,000 in new ordinary and preference shares or stock. By way of loan capital, the Company have raised £95,000 of 4 p.ct. debenture stock, and £485,000 of 7½ p.ct. mortgages; and they are authorized to borrow further sums not exceeding in the whole one-third of the additional capital raised. The rights of the Company and the Rotherham Corporation with respect to the laying of mains and the supply of gas within an area situate in the limits of both the Company and the Rotherham Corporation are defined by an Act of the latter passed in 1904; and similarly the respective rights of the Sheffield Gas Company and the Stocksbridge Gas Company are defined in the latter Company's Act of 1919.

CAPITAL POWERS.

By the terms of the Bill, the Company are authorized to raise such an amount of additional capital by way of ordinary or preference shares or stock as will produce (after taking into account premiums or discounts) the sum of £600,000, already mentioned. Existing stock and all ordinary stock forming part of the additional capital, and so entitled to a basic rate of dividend of 5 p.ct. per annum, shall be deemed to form part of one and the same stock. Power is given to raise, by the issue of debenture stock, sums not exceeding £580,000. The Company may also borrow on mortgage sums not exceeding in the whole one-third of the amount of additional capital raised. If preference and debenture stock are issued, they may be redeemable. Power is taken to offer shares and stock for subscription and to pay commissions.

MINIMUM HOLDINGS OF STOCK AND SHARES.

A clause governing the minimum holdings of stock and shares reads as follows:

> The ordinary stock and shares, preference stock and shares, and debenture stock of the Company shall be issued, and be held, in amounts of £10, or of any integral number of pounds exceeding £10, and not otherwise; and the Company shall not be under any obligation to register a transfer of any such stock or shares which would reduce the holding of the transferor below, or make the holding of the transferee less than, £10 of stock or shares of that class.
>
> Notice of this enactment, so far as applicable, shall be stated in all certificates of ordinary stock or shares, preference stock or shares, or debenture stock of the Company issued after the passing of this Act.

THE BOARD.

The ordinary meetings are to be held in Sheffield yearly. The qualification of an elected Director shall be the possession in his own right of ordinary or preference shares or stock of the Company of a total nominal amount of not less than £1000. The total remuneration to be paid to all the elected Directors, exclusive of remuneration paid to any Managing Director, shall not in any year exceed £4000. The following is part of a clause referring to Nominee Directors:

> The Corporation may from time to time appoint three persons being members of the City Council of Sheffield, but not being stockholders in the Company, to be three Directors in addition to the elected Directors, and may appoint another such person in the place of every Nominee Director who resigns, dies, or becomes incapable of acting, or retires, or is about to retire, under the provisions of this Act, or ceases to be a member of the said Council, or becomes a stockholder in the Company.
>
> The Nominee Directors shall retire from office at the ordinary meeting for the election of Directors in every year, and shall be re-eligible forthwith, or by anticipation; and except as by this Act otherwise provided the Nominee Directors shall have the same powers, and be subject to the same provisions and regulations as the elected Directors.
>
> No Nominee Director shall be entitled to receive any remuneration.

Lands which the Company may use for gas purposes are described in a schedule, and the limits of supply are defined. There are also included in the part of the Bill relating to the supply of gas a series of interesting clauses, which are reproduced below.

EXTENSION OF MAINS WHEN REQUIRED BY CORPORATION, &c.

If and whenever the Corporation or other body responsible for the public lighting of streets within the limits of supply require the Company, by notice in writing addressed to the Secretary, to light any street under the jurisdiction of the Corporation or other body so requiring, and being a street situate within the limits of supply and not already lighted with gas, the Company shall extend their mains into and along that street for the purpose of lighting it with gas: Provided that in every such case the Corporation or such other persons shall place, and during all contracts with the Company light, lamps at distances not exceeding on the average 60 yards from each other along every extension of the Company's mains so required: Provided also that no such new main shall be so required to be laid during the months of November, December, January, and February.

EXTENSION OF MAINS TO BE APPROVED BY CORPORATION.

From time to time before the Company extend any of their mains they shall give to the Corporation notice in writing of the desire of the Company to make the extension, and the Corporation shall consider and determine on the propriety of the extension being made; and except as by this Act otherwise provided, the Company shall not make any such extension without the previous approval thereof by the Corporation.

If the Corporation fail for six weeks after notice to them by the Company of the desire of the Company to make any such extension to give notice in writing to the Company of the determination of the Corporation thereon, the failure shall be deemed an approval by the Corporation of the proposed extension.

If the Company be dissatisfied with any determination by the Corporation as to any proposed extension, the Company may appeal to the Court of Quarter Sessions for the West Riding of the County of York, and the provisions of the Companies Clauses Consolidation Act, 1845, with respect to appeals to Quarter Sessions shall apply to the appeal: Provided that the Court hearing the appeal shall not quash or in anywise alter any determination by the Corporation as to any proposed extension so far as it is intended to be carried beyond the limits of the city, unless it shall be proved to the satisfaction of the Court that such proposed extension, so far as it is intended to be carried beyond the last-mentioned limits, will yield to the Company a clear profit of 5 p.ct. per annum on the probable expense of, and incident to, the extension beyond those limits.

COMPANY TO LAY PIPES FOR LIGHTING BUILDINGS.

Subject to the provisions of the Gas-Works Clauses Act, 1847, the Company may lay any pipe, branches, and other necessary apparatus from any main or branch pipe into, through, or against any building for the purpose of lighting it, and may provide and set up any apparatus necessary for securing to any building a proper and complete supply of gas, and for measuring and ascertaining the extent of supply.

COMPANY TO SUPPLY GAS FOR LIGHTING STREETS.

If the Corporation or other persons having the lighting of the streets within the limits of supply so require, the Company shall supply gas for such lighting either by meter or at a fixed price for every lamp or burner used for the street lighting, or partly by meter and partly at such a fixed price as the road authority from time to time elect: Provided that the fixed price shall not exceed 35s. 2d. a year for every lamp or burner burning 2200 hours a year and consuming on the average 4 c.ft. of gas an hour: Provided also that, on the renewal of any contract between the Company and the road authority for lighting the streets within the limits of supply, the road authority shall be entitled to claim or require that the price at which gas shall be supplied per 1000 c.ft. by the Company for every lamp or burner burning 2200 hours a year and consuming on an average 4 c.ft. per hour shall not be more during the continuance of the renewed contract than the average price per 1000 c.ft. at which during the year preceding the renewal of the contract the Company shall have supplied gas to private consumers of more than 500,000 c.ft. per annum under any contract or agreement made after the passing of this Act. Any difference which shall arise between the Company and the road authority as to such average price shall be settled by arbitration.

COMPANY TO SUPPLY GAS ON BEING SO REQUIRED, AND HAVING SECURITY FOR PAYMENT.

The Company shall, at the expense of the owner or occupier of any public or private building or land who so requires, lay all necessary pipes to communicate with the Company's mains, and provide him with a supply of gas for the purpose of lighting or being used in the building or land, and also (if required by him) with a meter (not being more than a 60-light meter) for ascertaining the quantity of gas consumed by him; but the person requiring the communication pipes to be laid or the supply of gas or meter to be provided shall (if required by the Company before he shall be entitled thereto) give such security in addition to that given by this Act for payment to the Company of the expense of, and incident to, the providing, laying, and repairing of the communication pipes, and for the gas to be so supplied, and for the meter and the rent thereof, as the Company think fit.

If the Company and the person so requiring the pipes or gas or meter cannot agree upon the security to be so given, the security shall be determined by a justice; and any justice shall, on the complaint and application of the Company and the person, or

either of them, determine the amount and nature of the security to be so given, and the decision of the justice shall be final and conclusive, and the security may be the deposit or prepayment of the money.

If the Company, after the justice has settled and decided the amount and nature of the security to be so given, and after the security is given or tendered to the Company, wilfully fail for such number of days not less than seven from the giving or tendering such security as the justice shall appoint, or if the Company shall not require the security, and shall fail for seven days after request in writing by the person to provide and lay the communication pipes and to furnish the supply of gas or the meter, then the Company shall forfeit to the person 20s. for every day during which the failure continues.

The declared calorific value of the gas is to continue at 500 B.Th.U.; and there are clauses regulating testing, one of which is to the effect that the Corporation may from time to time (if they think fit) appoint a practical chemist, or other competent person, to test the quality of the gas supplied by the Company, and the Company shall pay him a remuneration for his services, to be fixed by the Corporation, not exceeding twenty guineas a year, or such other annual sum as may be agreed between the Directors and the Corporation.

Coke Oven Gas.

The Company may enter into agreements for the purchase of coke oven gas, and may supply such gas to any authority, company, or person within the limits of supply for any purpose. They shall not, however, furnish coke oven gas for lighting purposes unless it is of the calorific value and purity, and furnished at the pressure, prescribed. In connection with coke oven gas supply for lighting, the Company are to be subject to the same obligations as in respect of any other gas for this purpose, and any coke oven gas so supplied may be tested in like manner as other gas sent out by the Company. None of the provisions of the Act, or of the Gas Regulation Act, 1920, with respect to the calorific value, purity, pressure, testing, or price of the gas supplied by the Company shall apply to coke oven gas supply for purposes other than lighting, and by means of mains or pipes through which other gas is not supplied; but nothing in this section shall deprive any person within the limits of supply of any right which he may possess of requiring a supply of gas of the calorific value, &c., prescribed under the Act, or the Gas Regulation Act. It shall not be lawful for the Company at any time to supply coke oven gas which does not possess a distinctive and readily perceptible smell; and for every contravention of this section, the Company shall be liable to a fine not exceeding £50. It is to be the duty of the Inspectors of Factories and Mines to enforce the provisions of this section within their district.

The Secretary of State for the Home Department may at any time either before or after the Company shall have commenced to give a supply of coke oven gas to consumers, make, in the interests of safety to persons, regulations, terms, and conditions with respect to such supply.

There is provision that, if any local authority or company supplying gas in any parish outside the limits of supply, in which the Company have, before the passing of this Act, laid mains under the provisions of the Act of 1917, or the present Act, shall request the Company to supply them with coke oven gas, the Company shall do so, and for this purpose shall permit the authority or company to connect the necessary pipes and apparatus with the Company's mains.

Basic Prices and Basic Dividend.

The basic prices of gas supplied by the Company are to be, for gas supplied within any part of the limits of supply other than the Dronfield limits, 7d. per therm; for gas supplied within the Dronfield limits, 10d. per therm. These basic prices may, at any time, and from time to time, be revised by an Order made by the Board of Trade under section 1 of the Gas Regulation Act, 1920, in the like circumstances, on the like conditions, and in the like manner as the prices could be revised if originally authorized by an Order made under that section. The basic rates of dividend on the ordinary capital of the Company shall be, on the existing stock, 5 p.ct. per annum; and on any ordinary shares or stock to be issued after the passing of this Act, such rate per cent. per annum (not exceeding 7 p.ct.) as may be authorized by the resolution creating the shares or stock.

The Company may (subject to the provisions of the next following section) charge for gas more or less than the basic prices; but except as by the Act otherwise provided, the Company shall not, in respect of any one year, pay any dividends on the ordinary capital in excess of the basic rates.

Uniform Charge for Gas.

The Company shall charge all consumers for gas supplied to them at the same price per therm, provided that—

This section shall not apply to gas supplied for public lighting or gas supplied under any special contract with any consumer whose consumption amounts to, or exceeds, 500 therm per year.

The Company may charge for gas supplied to consumers within the Dronfield limits prices exceeding by not more than 3d. per therm the prices charged to similar consumers within the remainder of the limits of supply.

Then follow clauses relating to the division of surplus profits, reserve fund, &c. The clause quoted below relates to the forfeiture of unclaimed dividends after twelve years.

Unclaimed Dividends.

If any dividend on any shares or stock not being debenture stock in the capital of the Company, whether already declared or hereafter to be declared, shall remain unpaid for twelve years after the time when it shall have become, or shall become, payable, the Directors may declare that the dividend shall be forfeited to the Company, and, if so declared to be forfeited, the dividend shall be treated as part of the profits of the Company for the year during which it shall become so forfeited.

Profit Sharing.

There are provisions enabling the Company to establish profit sharing. It is provided that there shall be a penalty for interrupting officers of the Company:

If any person wantonly or maliciously hinder or interrupt the Company, or any of their agents, servants, or workmen, in the exercise of any of the powers of this Act, or in anywise cause or procure the same to be done, he shall, for every such offence, forfeit to the Company a sum not exceeding £5, and also the full amount of the damage sustained by the hindrance or interruption.

This comprehensive Bill concludes with a number of protective clauses and several schedules, one of which defines the limits of supply.

[*Parliamentary Agents: Messrs. Rees & Freres.*]

SMETHWICK.

Gas Supplies to Working-Class Houses.

In a General Purposes Bill to be promoted by the Smethwick Corporation there is a clause in the following terms to make provision for securing a supply of gas to certain working-class houses:

If the occupier of an existing house situate within the limits for the supply of gas by the Corporation, which is occupied by persons belonging to the working class, and in which the pipes, wires, and apparatus necessary for affording either a supply of gas or a supply of electricity are not laid or fixed, shall request the Corporation to afford a supply of gas to such house, the Corporation may, at their own expense, lay down, fix, and maintain all such pipes, apparatus, and fittings as may be necessary for affording such supply, causing no unnecessary damage and forthwith repairing all damage caused: Provided that the Corporation shall not commence to lay down or fix such pipes, apparatus, and fittings, unless the owner of the house shall have been requested in writing by such occupier or the Corporation to lay down and fix the pipes, wires, apparatus, and fittings necessary for affording either a supply of gas or a supply of electricity to such house, and shall have refused, or for the space of one month after the date of such request shall have failed so to do.

The Corporation and their officers, servants, contractors, and workmen shall be entitled at all reasonable times to enter upon such house and the curtilage thereof for the purposes aforesaid, and the owner and any other person having any interest in the house shall afford all such facilities as may be necessary for the purpose; and any person who shall fail to afford such facilities or shall obstruct the Corporation in the exercise of the powers of this section, shall be liable to a penalty not exceeding £5, and to a daily penalty not exceeding 40s.

The pipes, apparatus, and fittings so laid down and fixed by the Corporation shall remain the property of the Corporation, and shall not be subject to distress or to the landlord's remedy for rent, or be liable to be taken in execution under process of any court or proceedings in bankruptcy; but the owner of the house shall be entitled at any time to purchase the said pipes, apparatus, and fittings (other than so much thereof as is situate between the main of the Corporation and the meter) upon paying to the Corporation the total cost incurred by them in providing, laying, and fixing the pipes, apparatus, and fittings necessary for affording the said supply, or on such other terms as may be agreed between the Corporation and such owner.

Until the pipes, apparatus, and fittings so laid down and fixed in any house are purchased as aforesaid, the Corporation shall be entitled to charge the consumer of gas in such house a sum not exceeding 5 p.ct. per annum, calculated on such total cost incurred as aforesaid, and the said sum shall be recoverable with, and in like manner as, charges for gas recoverable by the Corporation.

In this section the expression "house" means any house or part of a house occupied as a separate dwelling, and the expression "owner" has the same meaning as in the Public Health Act, 1875.

[*Parliamentary Agents: Messrs. Sherwood & Co.*]

(To be continued.)

NEW GASHOLDER AT BOMBAY.

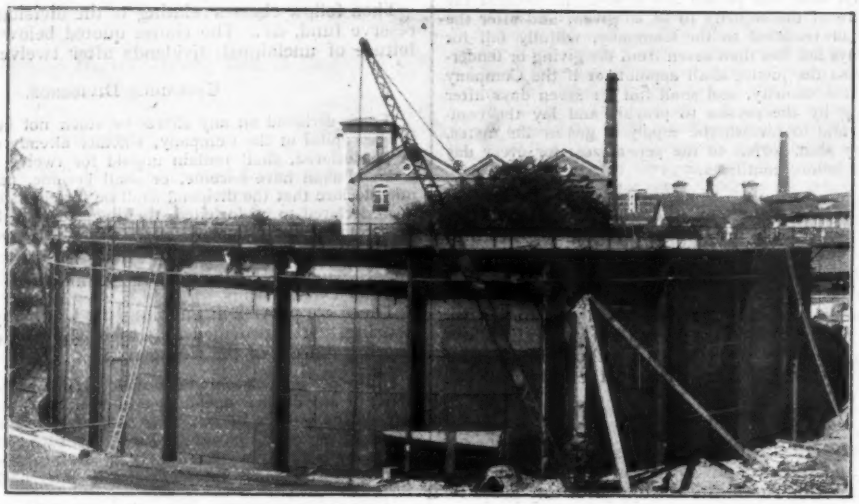

FIG 1.—TANK IN COURSE OF ERECTION.

Owing to the increasing consumption of gas, the Bombay Gas Company, Ltd., decided to add to their storage capacity; and the contract for the supply and erection of a new gasholder was carried out by Messrs. Thomas Piggott & Co., Ltd., of Birmingham, to the design of Mr. George Evetts, M.Inst.C.E., of London.

The holder, as will be seen from the photograph, is of a pleasing design, and is a very well proportioned structure. It is of the vertical guided type, having three lifts, with a steel tank, and has a working capacity of 1,500,000 c.ft. The sheets and plates in the three lifts are constructed throughout of "Armco" ingot iron. All the rivet holes in the tank and gasholder were drilled, and the plate edges planed.

The photographs show the tank and gasholder in various stages of erection, and also the work when completed, with the holder fully inflated. The whole of the erection work was

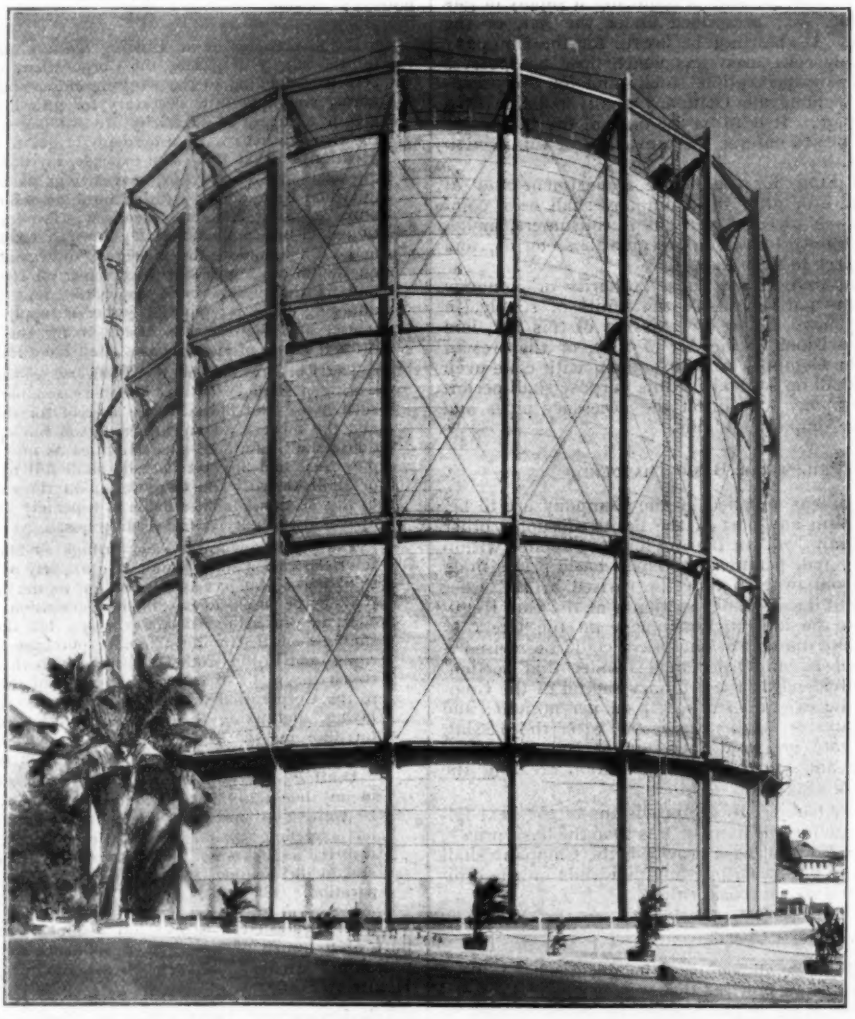

FIG. 2.—THE COMPLETED HOLDER.

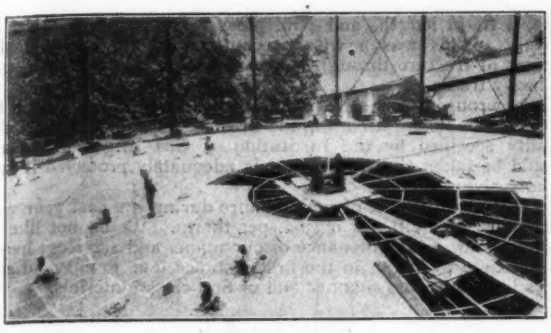

Fig. 3.—View showing Crown Sheeting and Framing.

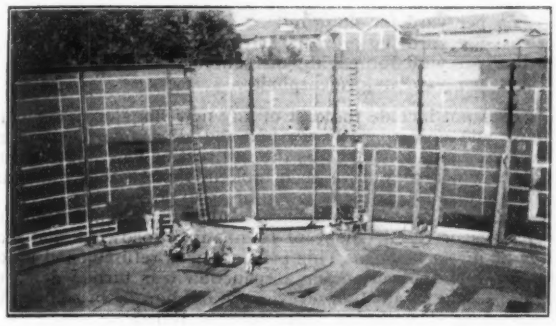

Fig. 4.—Inside of Tank and Outer Lift in Course of Erection.

carried out by native labour under the supervision of skilled erectors sent out from England.

The following are the principal dimensions :

Inner lift	138 ft.	dia. by 33 ft. 6 in. deep
Middle ,,	140 ,, 6 in.	,, ,, 33 ,, 6 ,, ,,
Outer ,,	143 ,,	,, ,, 33 ,, 6 ,, ,,
Steel tank	145 ,,	,, ,, 35 ,,

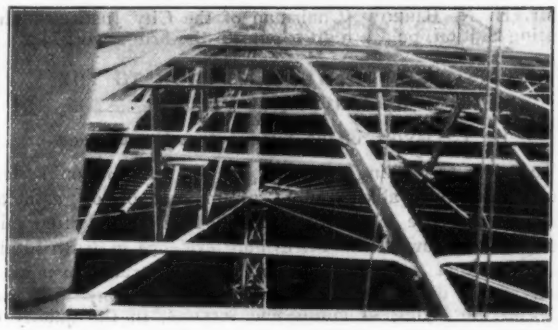

Fig. 5.—Roof Framing.

The bottom plates of the tank are $\frac{1}{4}$ in. thick, with an outer ring of plates $\frac{3}{8}$ in. thick. The sides are in seven tiers varying in thickness from 1 in. to $\frac{5}{16}$ in. The five lower tiers have inside and outside butt straps on the vertical joints, and are designed to give a high efficiency. Around the top of the tank is fixed a platform constructed of steel chequer plating and provided with two rows of handrail tubing. An overflow pipe is fixed to the side of the tank, to carry off any surplus water.

The crown of the inner lift has a rise of 9 ft. 6 in. in the centre, and is a true segment of a sphere. The crown is supported by a framing consisting of thirteen main trusses, thirteen intermediate trusses, and twenty-six tertiary rafters, complete with the necessary purlin bars and sway bracing. The bracing in the main and intermediate trusses is formed of angle bars with round main tension rods fixed to a centre post.

The outer row of crown is formed of $\frac{1}{2}$ in. plates butt strapped at joints; the next row is $\frac{5}{16}$ in. thick, the centre plate $\frac{5}{16}$ in., and the intermediate rows 10-gauge. The intermediate sheets in the side of each lift are 10-gauge; the top and bottom rows being formed of plates. The guide framing, which is of substantial design, is constructed of rolled steel joists, and is so arranged that all the surfaces are easily accessible for painting. Access to the crown of the holder is provided by means of ladders fixed the full height of the framing.

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

Visit to the Meter Works of Messrs. Sawer & Purves, Manchester.

On Jan. 9, members of the Association assembled at Victoria Station, Manchester, where they were met by Mr. Davies (Manchester Representatives of Messrs. Sawer & Purves). Motor 'buses, provided by the firm, were in readiness to take the party to the works; and on arrival there, the visitors were welcomed by Mr. Morley (Director). Afterwards they were conducted over the works by Messrs. Mercer, Sides, and Davies.

DESCRIPTION OF THE WORKS.

The firm was established in the year 1869, and has therefore been in existence for sixty years. Originally founded by the late Mr. Dennis Murphy and Mr. Fletcher, who traded under the name of Fletcher & Murphy, the business was later taken over by Mr. James Sawer and Mr. J. L. Purves. In the early days of its existence, the firm's products consisted mainly of tin cased dry meters and iron cased wet meters. Later on they commenced to make the unvarying waterline meter (Saunders and Donovan type), of which they supplied large numbers.

In 1889 Messrs. Thorpe & Marsh patented their original prepayment meter; and the first fifty ever put into use were made by the firm, and were supplied to Liverpool. This was the beginning of the great slot meter industry. In 1897, the business having increased to such an extent, the firm found it necessary to build an entirely new factory; and this has had to be extended from time to time to cope with increased trade.

The present works consist of a modern three-storey building occupying practically an island site. It contains two large tinshops, attachment shop, brass shop, mechanics' and joiners' shop, index room, and press shop with brassfoundry in a separate building.

The firm take every precaution to see that workmanship and materials are the best; and as far as materials are concerned they commence with the virgin metals and raw materials as far as possible. All the brass castings are made in the firm's own foundry, for they believe it is safer to know exactly of what each part is composed. The metal for wet meter drums, floats, &c., is mixed, and run into suitable moulds ready for rolling in the heavy rolling mill specially used for this purpose. The press department contains presses of varying power, capable of doing either fine or heavy work, according to size of meter and material used.

Believing that the diapharagms are the heart of the meter, the firm take special care to see that only the best Persian sheepskins are used; and these are most rigidly inspected before being passed for employment. The pan leather now being largely used by Messrs. Sawer & Purves is interesting in view of the fact that no solder is used to attach the leather to the pan, and consequently the risk of burnt leathers does not exist.

The various types of prepayment meter which have been made by the firm since 1889 form an interesting collection. Each meter designed has been an improvement on its predecessor, and the "Victory" change-plate meter is simplicity itself; the attachment, valve box, &c., being all outside the meter and readily accessible.

The call for high-capacity meters during recent years has induced the firm to design a meter specially for this purpose; and they have produced a model which registers correctly under varying loads, with a minimum loss of pressure. It contains no gas in the top chamber, and all unnecessary turns and twists in the gas passages have been eliminated. The valves are of special design calculated to give increased volume with an almost entire absence of friction.

The firm specialize in brass main taps, steam valves, and gas fire and lamp taps. All barrels are ground in by hand, and every tap is tested under water to an air pressure of 40 lbs. per sq. in.

After the inspection of the works, the visitors were entertained by the firm at dinner.

Mr. MORLEY extended a hearty welcome to the guests, remarking that it was about twenty-eight years since the Association last paid them a visit.

Mr. H. J. HAILSTONE (President of the Association) proposed a vote of thanks to the firm; Mr. SHENTON (Rainford) seconding.

Mr. H. N. BARROW (Chairman of the City Justices Meter Testing Station) paid a high tribute to the firm's work.

DISTRIBUTION WITH RELATION TO THE SELLING PRICE OF GAS.

By T. DAVIES, of the Burnley Gas Department.

To affect the selling price of gas, the distribution system must primarily be able to afford an ample supply of gas at an adequate pressure to each consumer. Economy is often misunderstood. Nowhere is there more evidence of truth in the statement that "a wise expenditure is the truest economy" than in the distribution department. Parsimony must not exist in the laying of mains and services, in the quality of materials used, or in regard to their capacity. It is futile to have a good quality of gas and efficient showrooms and appliance selling organizations (though these in themselves are very necessary) if the commodity they use is not efficiently supplied. Complaints counteract the sales of appliances more thoroughly than a well-equipped organization can overcome.

The object of my paper, the title of which was chosen by your Council, is to bring to your notice many of the features and everyday cares which are necessary to obtain such an efficient service of supply. Much of the subject-matter is possibly of common knowledge to many of you, but I hope that some new features may be presented to all, and that the paper will evoke a good discussion.

FEEDERS, SERVICE MAINS, AND SERVICES.

The statement made in my preliminary remarks can be amplified by saying that the success of the distribution department depends on its ability to supply, and give entire satisfaction to, each and every one of the consumers. By "satisfaction," I mean an ample supply of gas without fluctuations in pressure during any hour of their requirements. This necessitates that all feeder mains to the various districts should be of ample dimensions, not only for the maximum load, but to take on a satisfactory margin of temporary overload, and provide for the increase in consumption which we are endeavouring to stimulate, and which, from past experience, I have no doubt we shall obtain.

Before the war, when building operations were taking place in small units in various portions of the town, such growth could be easily dealt with, and did not cause undue anxiety; but the advent of housing schemes and the erection of blocks of from 100 to 1000 houses on one site simultaneously—dependent on the size of the town—call for serious consideration. The feeder mains in such a district must necessarily be overdrawn; and costly schemes have to be introduced to counteract this tendency to unbalanced development of the town. In many cases the cheapest means of dealing with such requirements is by high-pressure boosting.

The small number of houses per acre now erected causes the cost of mains and services to increase considerably per consumer, and I am afraid that nothing can be done in this regard except in those towns where builders are expected to pay for their services.

The large development of gas consumption has indicated the weakness of distribution systems of many years ago. Most of the smaller undertakings were content to drift along without any eye to the future, and provide gas for the lighting load only. Some of the more enlightened undertakings were awakened to the possible increased consumption of gas for cooking purposes. Progressive gas appliance makers were then holding exhibitions in such towns. Before very long those undertakings found that mains and services were too small; and the advent of gas fires, hot water apparatus, and other appliances, has now shown us that even in the better-situated undertakings most of the service mains and services are much too small to give that efficient service the consumer desires. We believe in Burnley that service mains should not be of less than 3 in. diameter; and all mains below this size are being replaced.

In common with many other towns, we find in Burnley that, in the old installations, a row of houses is supplied by a ¾-in. main. Such instances are relics of the bygone ages, and have come to light by the consumer purchasing some larger apparatus. We had also many small services ⅝ in. in diameter; and these are being replaced by services of at least ¾ in. for lengths up to 12 ft., and above this by 1 in. or over according to the prospective consumption and the distance from the main.

Three years ago we commenced systematically to go through the town and replace all mains and services inadequate in size. Up to date we have replaced 23,368 yards of main with a larger diameter, and 3027 services. This work will continue until the whole of the town has reached the standard we require.

MAINTENANCE OF MAINS.

In the first place it is necessary that all pipes should be of good quality and strength. In Burnley it has been the custom for some years to specify that all small pipes be of greater than standard weight; 3 in. diameter pipes being 1 cwt. 1 qr. per pipe, 9 ft. in length, and 4 in. pipes 2 cwt. 10 lbs., 12 ft. in length. This was a wise precaution, having in mind the danger of fracture through subsidence, and the increasing use of heavy traffic.

The wrought-iron tubes laid in the ground should not be of less than steam strength, and in these days should be of the quality specified by the Institution of Gas Engineers. Care should be taken that the tubing is adequately protected if laid in corrosive ground.

In Burnley the cost of maintenance during the past year was 1·60d. per 1000 c.ft., or 0·336d. per therm. We do not like to spend money on maintenance of our mains and services; hence our anxiety to instal, in the first instance, our mains and services in a first-class manner and of first-class materials.

RE-INSTATEMENT.

Unfortunately the cost of re-instatement of roads and streets has risen greatly since the war. Our costs in Burnley are:

2s. per yard for flagging.
6s. per yard for ordinary paving.
10s. per yard for paving on concrete.
22s. per yard natural asphalt.

This does not include the cost of any new flags or new paving stones; and unfortunately we find the Highways Department have a tendency to charge us the full cost of new flags for any old ones which may have been broken, though they may have been in previous use for a period of 25 to 30 years.

We have endeavoured, unsuccessfully, to obtain a reduction in charges or the privilege of re-instating roadways and footpaths by direct labour. This privilege was refused, and unfortunately our application for a reduction was turned down on account of the production of evidence of charges in some other towns being even higher than those in Burnley.

Another item of expenditure which has fallen heavily on gas and water undertakings in recent years is that caused by the improvement of highways. We have been refused the cost of alterations of gas mains unless they were exposed. The alternative is to leave the mains in the middle of the highway, which is contrary to our practice; our general rule being to lay them under the footpaths.

While dealing with this aspect of our expenditure I would like to refer to the greater use of our streets and roads by heavily-laden motor wagons. These roads were never constructed to carry such heavy weights travelling at so great a speed; and the large amount of vibration causes us considerable anxiety. Unless there is some limitation by law in the future, I am afraid it will be necessary for the gas industry to review the whole question of the construction and laying of gas mains. Even the roads themselves as constructed cannot withstand this traffic, and if they are made stronger we shall find that repairs to our mains will be even more costly.

I think that every undertaking is suffering more than formerly from leakage from fractured mains. The danger of loss to life and property is a serious matter not only to the undertaking concerned, but to the whole gas industry. This trouble also applies to some extent to the water undertakings.

BOOSTING.

As previously mentioned, it is necessary in most undertakings in these days to boost the supplies of gas to the outskirts of the district where the mains have been excessively drawn upon. We adopt the boosting mains for our supplies of high-pressure gas for lighting purposes. We have had installed for many years two rotary compressors, each capable of an output of 50,000 c.ft. per hour. Either or both machines can be working as the consumption requires, in order to avoid excessive use of power.

The high-pressure mains from these compressors are 10 in. diameter steel to three Reynolds governors, and one 5 in. diameter to a governor in another district. Our object is to give as even a pressure as possible at the point of consumption. This is not easy to achieve in view of the heavy peak loads which occur at certain hours and periods of the week.

Our station governors are operated to assist in this direction, and the Reynolds governors are set to come into operation when the pressure at the point of admission is reduced to 4 in. by the draw on the low-pressure mains. From midnight until 6 a.m. we reduce our pressure to that which will just meet the small requirements for consumption during the night. We have some of our high-pressure street lamps working throughout the night, which necessitates the running of our small compressor. In order to prevent gas from passing through the Reynolds governors, we have installed a small additional governor worked by a clock controller (similar to those installed for street lighting) which closes the supply to the main governor and low-pressure mains during the desired period.

METERS.

The accommodation for meters was never seriously considered in the past; and the greatest difficulty was found in fixing meters of the size required for the ever-increasing consumptions. As we only instal wet meters, this was, with us,

a greater problem than in the case of those undertakings who fix only dry meters. The advent of high-capacity meters has, in all instances, considerably relieved the difficulty; but at the same time we insist that proper provision must be made for meters in all houses now erected. We also convert, in our own shops, small meters. This enables us to obtain a consumption of 45 c.ft. per hour from a 3-light meter.

We fix nothing less than a 30 c.ft. per hour meter in these days, except in such premises where it is impossible for them to use appliances other than for lighting, or a griller. We consider that the entire use of wet meters is an aid to economy in the distribution department. In this regard many of the members may disagree with me; but no argument which has yet been brought forward has induced us to change our opinion.

All our meters are inspected twice per quarter—once for reading the index, and the second time for general inspection, watering, and test for registration. Every meter is tested for registration by the meter inspector once per quarter, by the use of a light. All our meters are repaired by our own workmen in our own meter repair workshops.

Lighting, Public and Private.

In towns where public lighting is controlled by the gas undertaking, a great opportunity for advertisement presents itself. Electrical undertakings recognize this, and are anxious to secure it. By the use of high-pressure lamps in thoroughfares where mains are available, and high-power low-pressure lamps in other thoroughfares, the usefulness of both types can be demonstrated, with the result that the attention of lighting consumers is drawn to their value. We have effected substantial economy in our street lighting costs by the lighting and extinguishing of all lamps by clock controllers. The savings in gas mantles and labour have been substantial, and the installation has worked very efficiently.

The improvement which has taken place in street lighting generally has brought along additional lighting consumers who employ similar lamps for exterior shop window illumination. During the past few years we have greatly developed this line of business. During the winter months many shopkeepers are lighting their windows from the outside only. The 1000 c.p. size is the one usually adopted; high-pressure gas being the most popular where a high-pressure main is available, and cluster lamps of a capacity varying from 6 to 15 medium mantles where only low-pressure mains are available.

These shop lamps have helped us to keep our lighting load, and recover a large portion of the shop-lighting load which we had lost to the electrical undertaking. The shop lighting season, of course, extends only from the middle of September until the middle of April. The advertisement value of these lamps is very great, particularly in such instances as one where we obtained an order from the local Co-operative Society, who discarded all electric lighting and substituted 33 high-pressure lamps in one block of buildings. Within a fortnight an adjoining block belonging to a multiple store gave us an order for 15 more of these lamps, which were fixed adjoining the other 33 on both sides of the road. The effect was very striking; and as attention is drawn to the fact that this lighting is by means of gas, the townspeople are able to observe that modern gas illumination can still compete successfully with other forms—both in lighting results and economy. This assists us to retain indoor lighting.

We are by no means convinced that the day has arrived when we should relinquish our internal lighting to our competitors. The folly of adopting such a course in our case is apparent when I state that we have 31,000 consumers, compared with 8000 supplied by the electricity undertaking.

Showroom and Sales Department.

The showrooms have proved their usefulness by the enormous amount of business which has resulted since their inauguration in Burnley about eight years ago. The present premises, which are in a central position in a shopping thoroughfare, replaced the showroom at the offices in a side street. It is necessary that the varied uses of gas be fully demonstrated; and by staging attractive window displays, and demonstration of the novel features of appliances introduced for further efficiency and for labour-saving, it has been possible to bring many more appliances into daily use.

In Burnley we gave demonstrations of suitable burners for mill lighting for low and medium pressures to the members of the Mill Managers' Association. We were rewarded for our efforts by invitations to instal the type of burner demonstrated throughout several cotton mills in the town.

It is, of course, inevitable that we should lose some mill lighting consumers, when they have the means of cheaply generating current themselves from their own surplus power; but it is astonishing what can be done by taking an interest in a defective gas-lighted installation before the consumer has become so thoroughly dissatisfied as to embark upon electricity generation.

The appliances sold should, if possible, be fixed by no one but the employees of the gas department, and adequate supervision must be provided to see that those appliances are properly fixed in an attractive manner. Full advantage should be taken of the opportunity for advertisement in the fixing of suitable appliances in doctors' or dentists' surgeries, and in architects' and other professional people's offices, even if there is some pecuniary loss in the first instance. If these appliances are efficiently fixed, further business will result. If not, the reverse will follow.

Maintenance.

No distribution department is complete in these days without the provision of some system of inspection and maintenance of appliances. Appliances require to be kept in a high state of efficiency without unduly increasing the selling price of gas. There are varied opinions as to providing consumers with free apparatus. In Burnley we do not give materials free, but provide all the labour in cleaning, adjusting, and fixing, free of cost. Many consumers are very careless in the use of free appliances, and can, by their carelessness, incur the department in heavy maintenance costs.

An efficient service department can, in our opinion, be maintained at a cost of 1d. per 1000 c.ft.; and when it is considered that economy is one of the most attractive advertisements of gas, it is not wise to burden the price with the cost of free fittings and superfluous maintenance.

Fixing of Appliances.

Though we hold the advantage in competition with electricity in the cost of fixing of heating and cooking appliances, and the cost in use, we must not relax our efforts in any direction. By the careful organization of delivery of appliances by motor, and the judicious use of the men available in order to avoid lost time, a greater output per man can be obtained. The number of appliances which can be fixed per man per day is worthy of discussion—not merely the number per fitter, but the number per man employed, including labourers and apprentices.

I think it is desirable that gas undertakings should, where possible, take on apprentices, as there is a tendency for shortness of supply of properly-trained gasfitters. Apprentice fitters and others ought to attend gas fitting classes; and we give our employees the opportunity to do so.

General.

Further incentives to the sale of appliances and gas lie in the provision of a quantity of piping free of cost, fixed with each appliance purchased, and the hire-purchase of all appliances, including water heaters, refrigerators, gas engines, &c. A gas undertaking should sell not only burners, but pendants and fittings, and undertake the fixing of them if the customer so desires.

Great attention should be paid not only to the increase of domestic consumption, but to the development of gas for specialized purposes, such as fish-frying, refrigeration, and industrial processes.

Scale reductions in charges for gas also play their part. In Burnley our maximum charge for all purposes by ordinary meter is 7d. per therm up to and including 50 therms; but in order to encourage those people who can afford to instal apparatus other than the ordinary gas cooker and copper, a reduction is given of 1d. per therm for the whole of the consumption up to 250 therms if the 50 therms consumption is exceeded. If the consumer uses over 250 therms and less than 2500, 1½d. per therm reduction is given on the whole of his consumption. This reduction applies to all domestic purposes, hotels, restaurants, retail shops, and bakehouses. Industrial consumers have other special terms.

Prepayment consumers are able to participate in this reduction by a credit note, which is given to them at the end of the quarter, and which, upon presentation at the office, results in a refund of the amount due to them. More often this money finds its way into the hands of the Corporation, for other purposes. Since the commencement of this system of reduction, we have noted a substantial increase in the number of consumers who benefit thereby.

Conclusion.

Though all the gas undertakings are experiencing keen competition from electricity undertakings, I consider that we have plenty of scope not only to maintain our business, but to increase our output. By carefully considering our expenditure, having due regard to efficiency and provision for the future, I have no fear for our development.

Discussion.

Messrs. J. Alsop (Bolton), I. H. Massey (Oldham), and Dean took part in the discussion, and spoke about the causes of present-day fractures and subsidences. Mr. Glover (Meters, Ltd.) gave an interesting talk on the gradual growth of the meter.

Mr. J. Graham (Lancaster), in moving a vote of thanks to the author, remarked that expenditure on the maintenance of mains, &c., was well repaid.

Mr. Massey seconded the vote; and the reply of Mr. Davies terminated the meeting.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Visit to the Works of the Tottenham District Light, Heat, and Power Company.

On Saturday, Jan. 5, members of the Association visited the Willoughby Lane and Lee Side Works of the Tottenham District Light, Heat, and Power Company, where they were received by Mr. H. C. Smith, M.Inst.C.E. (Engineer in Chief to the Company), and the following members of his staff: Messrs. Hawkyard, R. Wilson, P. C. Gardiner, A. B. Tobey, H. P. Morley, J. Gedge, O. F. Harris, H. Wadsworth, R. E. Gibbins, G. W. Brighton, A. W. Harris, A. G. Ball, W. Bradford, J. A. Little, and A. Tracey—all of whom acted as guides to the visitors.

THE TOTTENHAM GAS-WORKS.

HORIZONTAL SECTION.

No. 1 Retort House contains 18 beds of 22 in. by 16 in. by 20 ft. retorts set in beds of eights, which are arranged in two benches of nine beds each. The eastern bench is set with moulded fireclay retorts, and the western bench with sectional silica retorts. The retorts are operated by a Fiddes-Aldridge machine, and the coke is removed to the coke hoppers and screens by a De Brouwer hot coke conveyor.

On the north side of the house is a control room containing a miniature scrubbing and purifying plant, supplying gas to a recording calorimeter and gravitometer. There is also an "Arkon" gas volume recorder giving a continuous record of the output from the house. The loading of the retort house governors is operated by the retort house foreman, and is effected by water-filled canisters controlled by eight press buttons in this control room.

Two Spencer-Bonecourt waste-heat boilers, each capable of evaporating 2200 lbs. of water per hour, are installed in the cellar. The nominal gas-making capacity of the house is 2 million c.ft. per diem.

No. 2 Retort House contains 24 settings of 22 in. by 16 in. by 20 ft. retorts set in beds of tens. Sixty retorts are of moulded silicium material, and 180 of 95 p.ct. silica sections. The retorts are charged and discharged by two Drakes machines, and the coke is removed by means of a De Brouwer hot coke conveyor.

The nominal capacity of this house is 4 million c.ft. per diem. The coke screening plant is of the "Whitehall" type supplied by Messrs. Strachan & Henshaw. There are two waste-heat boilers situated in the retort house cellar, each having an evaporative capacity of 6000 lbs. per hour.

PURIFYING PLANT.

Both horizontal retort houses have common condensing, exhausting, and purifying plant. There are three water-tube condensers, each having a water area of 3000 sq. ft. and two atmospheric units with a cooling surface of 5000 sq. ft. each. These latter are fitted with water sprays. New reinforced concrete purifiers were erected last year. These consist of 15 boxes, each measuring 25 ft. by 32 ft.; the gas being divided into three parallel streams. In the construction of these boxes special provision was made for preventing the leakage of gas through expansion cracks. The whole structure was divided into a number of constructional units; the concreting of the whole of each unit being carried out without a break.

After leaving the purifiers, the horizontal coal gas passes through station meters of the Connersville positive type. These meters have a nominal capacity of 3 million c.ft. per diem each, but are capable of sustaining a considerable overload.

VERTICAL SECTION.

No. 3 Retort House was constructed in 1916-17, and contains 56 Woodall-Duckham vertical retorts arranged in two benches of 28. The north bench was reconstructed last year, and the south bench is to be reconstructed during the present year. Each retort has a throughput of 7 tons per day when carbonizing Yorkshire coals, and the settings are heated by gas generated in producers arranged at the end of each bed. There are two producers to each half bench of 14 retorts. The capacity of the whole house when completed will be 6 million c.ft. per diem.

There are two Babcock & Wilcox waste-heat boilers, one at the base of each stack. The coal and coke are handled by means of gravity-bucket and band conveyors, and the coke is screened by Drakes "Cascade" screens, which grade it into five sizes.

CARBURETTED WATER GAS PLANT.

This plant was put into operation in 1894. At that time Beckton was the only works in England using this system. The plant now consists of 5 sets, 3 of which are arranged for back-run working, and have a capacity of 1½ million c.ft. per diem each. The remaining two are not back-run plants, but work in conjunction with a waste-heat boiler; their daily capacity is 1¾ million c.ft. each.

The water gas section purifiers are all of cast-iron construction. The method of filling one section of these is of interest. The apparatus used consists of a combined elevator and shuttle belt conveyor, by means of which oxide can be raised from ground-level and delivered to any point in the boxes.

BOILER PLANT.

In addition to the waste-heat boilers already mentioned, there are three other boiler houses at the Willoughby Lane Works. All the boilers in these works are linked together, so that a high load factor can be maintained on each.

BOOSTERS.

The booster house is situated at the main entrance to the works, and is divided into two sections. Each section consists of duplicate sets of turbine driven Rateau fans, and the necessary station governors. One of the governors installed in the newer section is of the gas pressure loaded type manufactured by Messrs. Peebles & Co. At the south end of this same section are erected a number of Widlake distant pressure indicators, which record the pressures at various points of the district.

NEW WORKS.

The present site in Willoughby Lane is now congested, and the erection of new plant has been commenced on the site east of the L. & N.E. Railway. The Lee Side Works, as these new works are called, are approached by a 24 ft. reinforced concrete road bridge crossing the railway. This was constructed in 1927, and was designed to withstand the Ministry of Transport standard loading.

The plant at present erected on the Lee Side Works is as follows: A 5-lift gasholder of 7 million c.ft. capacity was erected in 1923. This is sealed in a brick tank 225 ft. in diameter, built in 1914.

The sulphate house contains two 5-ton Wilton plants fitted with rotary final dryers, and arranged for manufacturing neutral salt.

The tar plant was erected by the Thermal Industrial and Chemical Research Company, and is capable of dehydrating 40 tons of tar per diem.

VOTE OF THANKS.

At the conclusion of the inspection, the party were entertained at tea in the Club Pavilion—Mr. H. C. SMITH presiding.

Mr. SMITH extended to those present a hearty welcome on behalf of the Chairman and Directors of the Company. He referred to the additions to the plant on the east side of the railway, to cope with the increased output pending the building of a new works there. The new plant consisted of a 7-million c.ft. holder and a sulphate plant. In connection with the Education Scheme of the Institution of Gas Engineers, which was of such importance to Juniors, he was glad to say that progress was being made with regard to the granting of the Royal Charter.

The PRESIDENT (Mr. W. Trevor Kenshole, of the Lea Bridge District Gas Company), in thanking Mr. Smith for his welcome, said that he had been particularly interested in the reinforced concrete purifiers, and in the boosting system. He was very glad to see present Mr. W. E. Dean, Engineer, Manager, and Secretary of the Exmouth Gas Company, and President of the Southern Association of Gas Engineers and Managers.

Mr. T. H. PRATER (Isle of Thanet Gas Company; Junior Vice-President of the Association) proposed a vote of thanks to the Chairman and Directors of the Tottenham Company, and to Mr. Smith and his staff. It was a great pleasure to him to re-visit the works where he had received his training.

Mr. LEONARD LACEY (Past-President) seconded the vote.

Mr. SMITH, responding, said that they were especially indebted to Mr. Hawkyard, of the Willoughby Lane Works, for much of the success of the meeting.

Mr. HAWKYARD remarked that the whole works were in a transition stage; but he could promise them something of interest the next time they paid a visit.

Mr. DEAN said that he had travelled 200 miles that day to be present at the gathering; but it was worth it to re-visit the works where he had commenced 35 years ago, when the annual make was 400 million c.ft., compared with the present 4000 million c.ft. It was also gratifying to see the London and Southern District Junior Gas Association, of which he was one of the early members, now 350 strong. He advised all the members to take advantage of the Institution Education Scheme.

WESTERN JUNIOR GAS ASSOCIATION.

A well attended Meeting of this Association was held in the showrooms of the Bath Gas Company on Saturday, Jan. 5, when a paper was read by Mr. W. Rogers, General Manager of Messrs. Cockey & Son, Ltd., of Frome, on "Waterless Gasholders." The address was well illustrated by means of lantern slides, photographs, and models.

The Chair was taken by Mr. T. B. ARMITAGE, the President, who stated that a slight alteration would be made in the sessional programme. The proposed visit to the Stroud Gas Works would be postponed until March, and the paper to be given by Mr. B. F. Harris would be brought forward to February.

WATERLESS GASHOLDERS.

By W. ROGERS, General Manager of Messrs. Cockey & Son, Ltd., of Frome.

The waterless gasholder, which is of German origin, was invented in 1916, and up to the present 169 holders are in use and on order in various countries, namely—Australia 3, Austria 1, Belgium 2, Brazil 1, Canada 2, Chili 1, Danzig 2, Denmark 2, France and Saar 15, Germany 76, Great Britain 12, Holland 8, Italy 1, Japan 5, Sweden 1, Switzerland 1, and U.S.A. 36.

The capacity of the waterless holders in use and on order to present day is, up to and including 500,000 c.ft., 33 p.ct.; from 600,000 c.ft. to 5 million c.ft., 53 p.ct.; and from 5 million c.ft. to 20 million c.ft., 14 p.ct.

BRIEF DESCRIPTION.

I will briefly describe the holder, passing on to a detailed examination.

It consists of a steel shell made of specially constructed plates to add strength, forming a polygon, with corners of steel joists or channels, and a steel bottom on a concrete foundation. The top is a braced steel framework forming the roof, covered with wood or sheet metal surmounted by a ventilator. The sides of the holder are girded by steel balconies, access to which is gained from the ground and to one another and to the roof by staircases. A gangway passes over the roof through the turret on to a gangway inside, and from there access to the piston is by a collapsible staircase or ladder. The top sides of the holders have windows to light the interior.

A piston works up and down inside the holder, the outside edge of which forms a tar trough, fitted with what may be termed at this stage a "piston ring," to prevent the gas escaping from the under side to the top side. Tar for the seal is pumped from the ground level outside the holder up to tanks fixed round the top, from which it overflows and runs down the inside of the shell into the tar trough round the piston. The slight quantity of tar locked in the rounded edges of the shell plates passes downwards as the piston rings move upwards, and flows to the bottom, where sealed overflows lead it to sumps outside the holder, whence it is automatically pumped to the top of the holder again.

ADVANTAGES.

In stating the advantages, it must not be inferred that this type of holder should supersede all other types; the question of its adaptability being, of course, subject to the individual opinions of the various gas engineers. One of the advantages of the waterless gasholder is the saving in the cost of a tank, which money can be utilized for additional storage. Further the total weight upon the foundations is considerably less with holders of this type.

Taking as an example a 5-million ordinary holder, the total weight of the holder and tank is (say) 2000 to 2500 tons, *plus* (say) 40,000 tons of water. In comparison with this, a waterless holder of the same capacity, including the piston only, weighs (say) 1200 to 1500 tons—that is, practically equal to the weight of the ordinary holder alone, without any tank or water. The reason for reduced cost of foundations can thus be seen.

The waterless gasholder shows a saving in capital cost in comparison with the ordinary holder in the larger sizes. Naturally the bigger the holder the greater the saving. There is also a saving in ground area, for it is the practice to build waterless holders much higher than other types. An average height for a spiral holder, including steel tank, is the same as its diameter. For example, a 200 ft. diameter holder would have (say) four lifts and a steel tank, each 40 ft. deep—a total of 200 ft.—but in the case of the waterless, the diameter would be (say) 180 ft. and the height 240 ft.—that is, roughly, one and a third times as high as the diameter; and holders of this type are built anything from this proportion up to one and two thirds of the diameter, or even higher.

FOUNDATIONS.

A very thin slab is required for the foundation, merely to level the ground, except at the circumference, to support the sides of the holder, and receive the foundation bolts. With a 5-million holder and outer ring of foundations with a total weight of about 1200 to 1300 tons, there is only a weight of about 1 to 1½ tons per sq. ft. on the ring (180 ft. holder). A holder of that size can be carried upon an outer ring, with no more weight per square foot than on a foundation carrying an ordinary gasholder and steel tank full of water; further, a waterless holder is no more than one thirtieth to one fortieth the weight of an ordinary holder with tank and water.

A stores can readily be formed under the holder due to the comparatively small weight to be carried. There is a stores of this kind under a 10-million holder, the walls being about 2 ft. thick at the circumference, and about 10 ft. 9 in. high, with a block of concrete at the centre, from which steel joists radiate to each angle of the polygon; the only additional supports being three intermediate concrete columns. The whole appearance is remarkable in the small number of columns necessary.

In such a case, the bottom plates are flanged similar to the side plates, giving them the necessary strength to span from one radial joist to the other. In addition to the bottom plates, there are a few inches of tar inside for almost the whole of the area carried by these columns. The concrete walls have piers at the corners of the polygon with open chequered panels in between, giving light and air to the interior.

With the waterless holder there is reduced excavation, smaller amount of foundation work, smaller diameter, stores underneath if desired, smaller ground area, no steel tank, and no water for the same.

With a stores underneath, every part of the holder is accessible inside and out while the holder is at work, except the under side of the piston and the inside of the bottom plates, the latter being covered with tar. Where stores are not desired the bottom plates rest upon the concrete. Before these are lowered into position, the foundations are given a coating of pitch to make them damp proof, and form a level surface on which is spread a thin layer of sand for bedding the rivet heads.

REDUCED UPKEEP.

There are no moving parts inside the holder, except the piston; no water to corrode the cups inside the top of the tank or outside the holder itself, as it moves in and out of the water; and no overflow from any cups to run down the holder.

In addition to the reduced cost of painting, the holder is accessible for inspection and painting at any time. Further, with a timber roof, there is neither corrosion inside nor outside. The inside of the shell is coated with a film of tar. The piston is under cover, accessible at all times. Under the piston the sides are coated with tar.

CONSTANT PRESSURE.

The holder throws a constant pressure, irrespective of the volume of gas, thus saving boosting or compressing. The piston throws anything up to 6 in. pressure with its own steelwork, and any desired pressure up to 20 in. can be obtained by concrete weights placed on the piston. It is only necessary to state in the first instance that future additional pressure may be desired, and the piston will be designed to suit. The weights are accessible, and additional weights can be put on as required.

Large numbers of inner lifts of gasholders are of very little use, due to lack of adequate pressure. The working of the holder is not affected by unequal snow loads, and, if desired, the rain water from the crown can be led to the ground by pipes.

The gas goes out of the holder as dry as when it comes in, there being no water vapour to pick up, which would otherwise condense in the district mains.

WORKING PARTS.

The working parts are all inside the holder, protected against atmospheric conditions, and accessible at all times, while the parts working in tar with an absence of friction require no attention, not even oiling.

There being no hydraulic cups and no tank water, there is no freezing of water to be dealt with. Even in this country this is an item for which provision has to be made in the shape of anti-freezers and steam raising plant. It can readily be understood what an expensive item this can be on the Continent and in America. The headway made in America by the waterless holder demonstrates its efficiency under these conditions. What has proved satisfactory in such parts of the world, exposed as they are to atmospheric conditions such as blizzards, should be equally satisfactory for our climate.

Trouble with ice inside as well as outside holders is not unknown in this country, and in some cases has resulted in fractures to standpipes, with flooding of mains, cutting off the supply of gas to the town, perhaps at a most awkward time of the year, quite apart from damage to the holder sheeting.

STEEL BOTTOM.

As previously stated, there are 2 or 3 in. of tar on the bottom, so that the plates are comparatively thin. The joints

are thus sealed from the gas with a layer of tar. The inlet and outlet pipes project a few inches through this bottom. A short distance from the side plates, a tar dam is formed all round the polygon, built up of steel channels riveted to the bottom plates. This dam receives the tar as it flows down the sides of the shell. Special means are provided at intervals round the shell, connecting this dam, for taking away any separated water. Tar overflows are also fixed at intervals with the required seal, connected to the sumps outside the holder.

The foundation is stepped back around the outside edge to allow for riveting the first row of side plates to the bottom plates with an outside joint, no bottom curb being necessary.

SIDE PLATES.

The side plates are specially constructed to add greater strength to the structure. The whole shell forms a regular polygon of any number of sides, according to the size of the holder, while the sides can be of any length up to the maximum capacity of the special flanging machine—about 30 ft. The plates are perfectly straight. No curving is necessary, as the special shape maintains straightness as well as strength. No rivets project through the sides to the interior of the holder, except at the standards.

One top edge of each plate is flanged square, and then flanged for a further distance. The bottom edge of the long side is also flanged. The angles formed by the sides of the polygon bring the flanged portions of the plates clear of the back flange of the standards. The ends of these plates are riveted to the flange plates up the standards.

The standards are formed of joists or channels with a thick wide flange plate riveted to the inner flange. These flange plates are machined. The short face is riveted to the standard, and the side plates are riveted to the two-angle surfaces. Special means are taken to ensure absolute accuracy both in manufacture and erection of this type of holder, and to accomplish this everything is jig or tinplate drilled.

The cold riveting is all one size for the long edges, and the hot riveting is all one size for the short edges. No further holes are required, comparatively speaking, in these plates, which present a perfectly flat surface for the piston ring to work against. Naturally there are no thinned corners required to these side plates. The four corners of the side plates are squared where the joint is made to the flange plates of the standards. Unless this were done there would be a gas passage, due to the curved edges caused by flanging.

Fabrication on these lines is so accurate that erection must follow suit, because, if the work does not come in perfectly, there is something wrong; and, due to the flanging of these plates, it becomes more a matter of a gas-tight joint, rather than a high efficiency joint as regards strength.

The joints are riveted with special pneumatic riveters and holders-up, most readily accessible from the gantries round the holder, resulting in a high rate of riveting. The hot rivets up the standards are countersunk on the inside of the flange plates, and then pneumatically ground to form a level path for the guide rollers.

STANDARDS.

The standards are formed of light joists or channels very simply constructed, being perfectly plain, and formed of single members. Excepting for a very small amount, the only workmanship in the webs is for the web plates connecting one length to another, and down the inside flange for riveting the flange plates for the guide rollers. There are one or two holes for junction plates which secure the top ends of the flange side plates to the standards.

Heavy steel feet are riveted to the bottom ends of the first row of standards, which are riveted in turn to the underside of the bottom plates, forming large extended feet to receive the two foundation bolts at each angle of the polygon.

ERECTION.

The bottom is built on trestles or props, and, in the meantime, one row of standards are fixed temporarily in position. The bottom is then lowered on screws, after which the screw holes are plugged. The first row of stanchions is then fixed absolutely correct, centre to centre, to synchronize with the bottom, using the first row of side plates as jigs, without attempting to make any joints. After screwing up the foundation bolts, the recesses for the feet of the standards are grouted in, and the same for the bolts, so that these stanchions are immovable. The first row of side plates is then laid down, permanently making the joints.

After the erection of the bottom of the holder the roof framework and covering is erected.

A central support is fixed, and over it a pillar or trestle to support the centre portion of the roof, the latter being a built-up circular girder, which lets the trestle pass through, ultimately allowing the ventilator to be fixed over the circular girder.

The trestle is carried through the roof, and surmounted with a turntable, on which is fixed an electric or other winch, operating a crane or derrick for erecting the side plates, standards, and roof work. This roof framework is ultimately self-supporting from the circumference of the holder, and is in such a form as to add great rigidity and strength to the structure. It is built up of steel sections without any provision for adjustment.

Suitable provision is made for attaching the main principals of the roof to the top ends of the standards, but during erection this attachment is made to the piston framework and not to the standards. The roof framework may be covered with steel sheeting or with timber boards and tarred felt, or similar substance. In the latter case there is no corrosion either inside or out. Steel erection members further connect the piston to the roof, from which a double row of erection galleries hang over the sides of the holder for plating and riveting the latter.

The erection members aforementioned also serve to carry the erection hooks which engage on to clamp plates secured back and front to the standards, thus allowing the piston, roof, erection tackle, men, and erection galleries all to be raised at the same time, at intervals during erection. These hooks automatically engage on to the clamp plates, and the piston thus requires no air pressure for its support.

Manholes in the sides of the holder and in the piston itself, allow access to the inside of the holder at any time until completion. The erection galleries carry a complete circle of air pipes, with stand pipes for riveting purposes, coupled to the air receiver at the compressing plant on the ground with flexible tubing.

THE PISTON.

After the erection of the roof framework and covering, the piston is erected on the bottom of the holder. This work, of course, can be proceeding at the same time. Great care is taken in erecting the piston to keep the stepped portion around the circumference dead level. The floor of the piston is formed of plates riveted together, similar to the bottom of the holder, and fitted with manholes. The outer edge is constructed in the form of a trough, stepped off, adding great strength, and making the necessary formation for receiving the piston ring.

The piston floor plates are braced together top or bottom, or both, with lattice or solid bracing, according to the design and the size of the holder, and the pressure of the piston. Lateral stiffness is by flanging the plates similar to the side plates. The main stiffeners radiate from the centre to each corner of the polygon. Of course, this piston is also in the form of a polygon to conform to the shape of the shell.

The trough is further stiffened by the built up steel triangular brackets, riveted to the underside, the bottom ends being formed into feet which rest on to the bottom, coming central with the heavy feet under the tank, and forming part of the standard feet. The latter have also special provision for a side bearing on to the foundation. This is to form a solid bearing for the piston whenever it comes to rest, so avoiding distortion.

The tar trough is made of such a depth as to give the necessary depth of tar to form the seal, and so prevent gas from escaping from the underside to the top side of the piston, the depth being to suit any desired pressure, naturally much in excess of the actual piston pressure.

THE PISTON RING.

I have previously referred to the piston ring, and something of this nature is naturally necessary to prevent the tar running out of the trough in any appreciable quantity. The piston ring must possess flexibility, and adjust itself to the exact shape of the holder under varying conditions of expansion and contraction due to atmospheric changes; and it must never wear out.

This is accomplished by a ring of steel in the form of a polygon to suit the shape of the inside of the shell under all conditions, so made as to cause no obstruction as it works up and down the inside of the holder. This piston ring I will describe as being made up of slippers working against the side plates, and shoes working against the face of the flange plates up the standards.

The slippers are flat steel, equal in length to the side of the polygon. The shoes are the width of the flange plates, and the shoes and slippers are recessed one into the other, and thickened up at the ends for that purpose, so as to form one continuous ring round the inside of the shell. It is this which has been referred to so far as the "piston ring."

Attached to the inside of this ring are the ends of the counterbalanced levers, which are secured to the piston by fulcrum brackets. At the junction of the slippers to the shoes they are specially arranged in pairs to distribute equally the pressure against the piston ring. It is a very simple device, but very effective, giving the necessary pressure, with flexibility of the piston ring to the sides of the shell.

Many alternative methods have been suggested for accomplishing this object, such as springs, sliding wedges, spring steel, and adaptations of these. The one described, however, is the only one operating on "M. A. N." holders, and has proved itself perfectly satisfactory in operation.

FLEXIBLE JOINT.

To take up any difference in slight expansion between the piston and the shell, a flexible joint is necessary, and this is made by a strip of sail cloth, which we will refer to as "canvas," secured to the back of the piston ring, and to the piston itself.

No part of this canvas comes in contact with a moving or sliding part of the holder or piston, and wherever the canvas rests it does so on a bearing also covered with canvas. A canvas covered wooden fender is used in the form of short rods, in order still further to keep the canvas away from the slippers and shoes. Many folds of canvas are employed, and all the joints are reinforced at least treble, and secured to the piston by wooden strips, also canvas covered. The canvas is held in position to the slippers in a similar manner, by steel plates with rounded edges.

Use is made of this canvas to divide the trough into compartments, so that in the event of the slightest tilting movement of the piston, the tar is locked in position. These canvas divisions are, of course, flexible, again allowing for that small amount of flexibility due to the relative expansion between the piston and the shell. At the top of each division there is a notch which allows the surface tar to flow all the way round the trough, thus making a compensator should any pump fail to act. The piston is guided by top and bottom rollers at each standard, working up to the flange plates. The bottom rollers are secured to the piston, and the top rollers to a rectangular steel framework; there being one top and bottom roller at each standard. This rectangular built-up framework extends all round the circumference of the piston, being braced in all directions; and from the inside of this framework, opposite each standard, triangular bracing extends towards the centre of the piston, thus forming a rigid structure which moves up and down the holder. The top and bottom rollers are working against a film of tar without any friction. Lubrication at other points is provided for, and is accessible for attention.

No provision is made for adjustment, as this is provided for when starting erection, and is not altered.

Circumferential movement is prevented at two opposite sides of the holder by a self-adjusting slipper, working against the face and machined edges of the flange plates, so as to adjust the slipper to any relative variation between the piston and the shell, due to expansion or contraction.

It will readily be understood that, due to the accuracy of building and the width of the rollers, there is very little tendency to lateral movement. Nevertheless, there is the provision as a precaution.

Speed of Erection.

Of course, speed of erection depends partly on the number of men and the amount of tackle employed; but this type of holder is of unit construction, and that is another reason why it is in the form of a polygon. Every bay is alike. There is no framing inside the shell. There are only two straight rows of hot riveting, connecting the shell to the standards, all the rest being cold riveting, with all outside horizontal joints. The erection galleries allow access to the two tiers of plates, and inspection and testing are done as the tiers of side plates are completed, as the erection galleries cannot be lowered on account of the permanent galleries, which are erected as the work goes upwards. Any further attention to the sides is done from the permanent galleries. The top of the piston is available for erection, during which it is only necessary to protect the tar seal.

From the foregoing, it will be seen that, given the men and material, it becomes a question of how quickly you can lift the side plates into position. These must be lifted singly, as nothing can be gained by stacking them on the roof. The plates have the advantage that they can be lifted by five men, so that the aim is to keep the lifting gear constantly employed, and here the ball-bearing turntable and quick-operating lifting gear comes into operation. As distinct from ordinary practice, it becomes a matter of a tier of side plates at a time, instead of a bay.

One lift with air pressure is equal to the depth of the plate, about 3 ft., and ten minutes is allowed for that, including the weight of the piston, roof, tackle, and men.

Tackle and Flanging Machine.

You will observe that a great amount of thought has been given to the tackle employed, which adds considerably to the success and speed of erection. The machine employed for cold flanging the plates is very powerful, exerting a pressure of many hundreds of tons for clamping and flanging. Both operations are electrically driven, the clamping being electric pneumatic. Two men can do all operations, each man having a small gauge accurately to align the plate ready for the three flanging operations the long way of the plate. The whole operation is very quick, the machine being accurate to a few thousandths of an inch. The machine embodies the experience obtained from the others in Germany and the United States. It is capable of accommodating plates up to 30 ft. long and ¼ in. thick.

The plate to be bent is placed in the correct position by means of gauges; all the work necessary on the plate, such as drilling, having been performed. The initial pressure is applied by pressing the gripping motor push, which operates a 4½-H.P. electric motor controlling the counterbalance levers and weights. Limit switches regulate the pressure applied, while the final grip is by compressed air; the movement of the lever applying the pressure uncovering the bending control buttons, thus ensuring that no bending takes place until the plate is subjected to the maximum grip. Bending is then carried out by a 45-H.P. motor, operated by a push button, and controlled by a limit switch. When the maximum bend has been reached the limit switch comes into operation, and reverses the motor, but bending may be stopped instantly in any position by a safety push-button.

After bending is completed the air valve is opened, automatically uncovering the gripping release button, which is pressed to release the plate, enabling it to be withdrawn from the machine. The electrical work is controlled throughout by interlocked contacts, preventing error arising in the operation of the machine. Inside the stanchions the guide plates, on which the piston rollers run, are riveted. These plates are machined on five faces on a milling machine with a capacity of 30 ft. at one setting. The importance of this machine is evident, since it determines the angle of the polygon of the holder. Two headstocks are fitted, the first having two cutters, which are accurately set to the angle of the polygon. After traversing to the second headstock, a gang of three cutters comes into operation, milling the outside edges and the top of the plate where required. A 35-H.P. motor drives the machine, giving it a traverse of approximately four inches a minute.

Permanent Galleries.

Round the holder are a series of galleries of a very protective design. These are supported on brackets riveted to the outside of the standards. They offer access to every part of the sides for inspection and painting, and are very useful during erection. They are not absolutely necessary, but are preferred by users, and they are not taken into account in reckoning the stability of the holder.

Staircases give access to the galleries from the ground, and to each other, and on to the roof. A platform goes across the roof to the ventilator, near which is a steel door for access to the interior of the holder.

In some holders a short staircase inside the ventilator leads on to a platform running across the inside of the roof, from which an extended observation can be made of the inside of the holder. A large amount of light is admitted to the interior of the holder from windows round the side at the top balcony level. Collapsible staircases to the larger holders, with handrailing each side, give easy access to the piston at any point. Ample ventilators are fixed round the top gallery, so constructed as to prevent the admission of rain or snow.

The holder blows when the piston is at its highest working point, which is some distance below the windows and the tar inlets, allowing the gas to pass into large tubes fixed at intervals around the circumference, and which are led upwards and fitted with cowls at the top, so that the gas passes into the atmosphere.

A wire rope attached to the piston, passed through the roof, down the side of the holder, and an arrangement of pulleys, indicates the contents of the holder, and the position of the piston.

Tar for the Piston.

The tar for the piston is specially prepared to prevent thickening. The experience gained has enabled a suitable tar to be produced that is neither too viscous nor too thin, meeting atmospheric conditions either in winter or summer, day or night; it not being necessary to vary the composition.

If separation of water takes place in the tar dam in the bottom of the holder round the outer edge, provision is made for drawing off this water at intervals around the holder. As previously mentioned, tar overflows into sumps fixed outside the holder, where further separation takes place. The sumps are fitted with floats which automatically operate switches by a simple mechanism, which in turn start or stop 2-H.P. electric motors, which are coupled to gearwheel pumps. When the float rises to a predetermied level the switch operates, and the tar in the sump is pumped through vertical pipes to the top of the holder sides at the level of the topmost galleries. The shell in each side of the polygon at this level is constructed to form tar storage tanks, from which the tar overflows through long notched openings, passing down the sides of the shell into the tar trough round the piston. The small quantity of tar that is necessary to pump can be realized from the small amount of current required to drive the pumps.

The tanks at the top side of the holder contain about a week's supply of tar, so that should any pump fail to act, there is a surplus of tar available for that period. A valve is fixed to each tank, to be used only on the failure of a pump.

It really comes down to a question of efficiently maintaining the electrical equipment and the pumps. Even supposing that a pump failed, and tar was not running from an overhead tank, it would not matter, because the tar in the trough round the piston would automatically compensate for it by flowing through the notched openings in the divisions of the trough.

Stability of Holder.

As regards stability, like any other type of holder, it is a question of wind pressure. Snow loads do not affect the working of the waterless holder, as they simply come on to a fixed

roof. Of course, the holders can be designed to withstand anything according to location, but an average design is for a wind pressure of 50 lbs. per sq. ft. with a factor of safety of 4 to 6. These holders have found great favour in the United States, and we are all familiar with, if not from actual experience, at any rate from reports of, the severe conditions that a structure of this kind has to endure. The same applies to some extent on the Continent.

The special construction of the side plates already described is purposely done to affect stability, and it is the chief reason for these holders being in the form of a polygon.

EXTENDING HOLDERS.

This type of holder is specially adapted for extending. It is best done by emptying the holder of gas, coupling up air pressure, raising the piston, coupling it to the roof, disconnecting the roof from the standards, removing the windows, and proceeding to build the sides in the way described. A large amount of work on an extension of this kind could be accomplished in two to three months.

Discussion.

Mr. A. E. BULLEN (Plymouth) asked how the costs of the waterless holder compared with the ordinary types.

Mr. H. J. ALLEN (Weston) stated that the waterless holder appeared to require constant attention, especially in the case of the electric pumps. What would be the approximate cost of running these pumps?

Mr. S. HOLE (Bath) asked what grade and type of tar were used for the seal.

Mr. S. B. JONES (Clevedon) raised questions concerning the life of the canvas containing the tar seal, and the provisions made for renewing this canvas.

Mr. C. BATEMAN (Bath) asked what would be the saving on a 3-million or 4-million holder. A 3-million spiral holder had been erected in the face of competition from the waterless holder. Why should this be?

Mr. J. KAYE (Bath) asked what would be the result of the back pressure thrown on the works if the piston could be weighted to any desired outlet pressure on the distribution side.

Mr. ROGERS, in reply, stated that up to a capacity of 750,000 c.ft. there would be no saving in the costs of different types of holders, but a proportionate saving was found as the size increased. At one works, 16,000 gallons of tar was pumped per day in 8 to 10 runs of 6 to 8 minutes' duration. As to consumption of electricity for a 1-million holder during 12 months, it was found to be from 217 to 265 units. A daily inspection of the pumps was usually made, and many ingenious devices had been invented to indicate any faulty working of any of the plant. The tar used was specially dehydrated, and could be bought at about £7 per ton. The canvas seal of a holder erected in 1916 was in as good a condition as when put in. In the case of a 2-million holder, the whole canvas seal could be replaced in about two days. The question of back pressure thrown by a weighted holder had not been raised by any works engineer, but it would certainly appear that attention would have to be given to this point.

In conclusion, a hearty vote of thanks to the lecturer was proposed by Mr. H. J. ALLEN, and seconded by Mr. S. HOLE, to which Mr. ROGERS briefly replied.

MISCELLANEOUS NEWS.

NOTICE OF ACCIDENTS ACT, 1906.

Extension of Provisions.

The following notice, cited as The Dangerous Occurrences Notification Order, 1928, dated Nov. 9, 1928, has been issued from Whitehall by the Secretary of State under the Notice of Accidents Act, 1906:

In pursuance of section 5 of the Notice of Accidents Act, 1906, I hereby extend the provisions of the said Act requiring notice of accidents in factories and workshops to be given to an Inspector, to the following classes of occurrences in a factory or workshop, whether personal injury or disablement is caused or not:

All cases of:

1. Bursting of a revolving vessel, wheel, grindstone, or grinding wheel moved by mechanical power.
2. Breaking of a rope, chain, or other appliance used in raising or lowering persons or goods by aid of mechanical power.
3. Explosion or fire causing damage to the structure of any room or place in which persons are employed, or to any machine or plant contained therein, and resulting in the complete suspension of ordinary work in such room or place or stoppage of machinery or plant for not less than five hours, where such explosion or fire is due to (i.) the ignition of dust, gas, or vapour, or (ii.) the ignition of celluloid or substances composed wholly or in part of celluloid, or (iii.) electrical short circuit, or failure of electrical apparatus.
4. Explosion or fire not included in paragraph 3 affecting any room in which persons are employed, and causing complete suspension of ordinary work therein for not less than 24 hours.

The Order came into operation on Jan. 1 last.

MANCHESTER HOLDER ACCIDENT.

Special Committee of Inquiry Appointed.

At a Meeting of the Manchester City Council on Jan. 9, the Gas Committee presented their reply to the Home Office report on the causes and circumstances attending the holder accident at the Bradford Road Gas-Works on Aug. 23, 1927 (see "JOURNAL," Vol. 179, p. 496; Vol. 181, p. 341; and Vol. 181, p. 559).

Alderman TITT moved a resolution to refer back the report. The Committee, he said, had first refused to make public the Home Office findings, and then had declined to discuss them on the ground that they had a "reasoned reply" in preparation. The reply turned out to be a distortion of the evidence offered at the inquiry, and of paragraphs selected from the Home Office report. For instance, one part of the Committee's reply quoted a statement of the Home Office report, to the effect that "the gasholders were inspected every hour, and the contents entered in the meter book," whereas the words of the report ran: "The contents, as gauged by the number of plates and rivets above water level, were entered, &c." The Committee professed themselves "satisfied" that the care taken of the gasholders went beyond the usual, despite the statement of the Home Office report that "no examination had been made of the inside of the holders" apparently since their erection 48 years ago. The whole character of the reply only went to strengthen the demand for a first-class engineer to take charge of the undertaking.

Councillor NOTON BARCLAY considered that to refer back the Gas Committee's report was wholly inadequate; and he suggested an amendment as follows:

> That the report of the Gas Committee be not accepted, and that a Special Committee be appointed to consider and report fully on the findings of the Home Office Inspector.

Alderman TITT accepted this amendment.

Councillor CLAPHAM, a member of the Gas Committee, challenged the competence of the Home Office Inspector. His report admitted that the cause of the accident could not be ascertained, and there was no evidence that any other undertaking was more careful than Manchester to maintain its holders.

Councillor WHARTON, another member of the Committee, thought that they should have accepted the Home Office findings without comment and in full. He pointed out that some of the holders at the Gaythorne Gas-Works were now sixty years old.

It was finally decided that the Nomination Committee should meet on Jan. 14 to appoint a Special Committee of Inquiry, which would be empowered to proceed without confirmation by the Council.

LIVERPOOL GAS COMPANY.

Extension of Discounts.

An extension of discounts allowed to large consumers is announced by the Liverpool Gas Company.

The present price of gas supplied through ordinary meters is 7·6d. per therm (approximately 3s. per 1000 c.ft.). The following new scale of discounts for gas consumptions in any one building will come into operation as from the December, 1928, quarterly index readings.

Scale B, for gas consumed in any separate building.—Where the consumption per quarter is—600 and under 1250 therms, 2½ p.ct. discount; 1250 to 2500, 3¾ p.ct.; 2500 to 5000, 5 p.ct.; 5000 to 7500, 6¼ p.ct.; 7500 to 10,000, 7½ p.ct.; 10,000 to 12,500, 8¾ p.ct.; 12,500 to 15,000, 10 p.ct.; 15,000 to 20,000, 12½ p.ct.; 20,000 to 25,000, 15 p.ct.; 25,000 to 30,000, 17½ p.ct.; and 30,000 and upwards, 20 p.ct.

AGGREGATE CONSUMPTIONS.

The undermentioned existing scale of discounts, which permits a gas consumer to aggregate the consumptions at his various premises, will be continued.

Scale A, Aggregated Premises.—Where the consumption per quarter is—4750 and under 14,250 therms, 2½ p.ct.; 14,250 to 23,750, 5 p.ct.; 23,750 to 33,250, 7½ p.ct.; and 33,250 and upwards, 10 p.ct.

A consumer may, therefore, (*a*) receive discount on the aggregate consumptions at his several addresses under Scale A; or (*b*) receive discount for any separate building under Scale B; or (*c*) receive discount for each selected separate building under Scale B, and for the remainder of his premises under Scale A. He cannot receive discount under both scales in respect of one and the same building. Discount will only be allowed where accounts are paid within one month.

DIARIES, CALENDARS, &c.

Since going to press with the last number of the "JOURNAL," diaries, calendars, or other office requisites have been received from:

Thomas Duxbury & Co., 16, Deansgate, Manchester.

Hammond & Griffiths, Ltd., Lithographers and Letterpress Printers, 1, Clement's Inn, Strand, W.C.

The Hassocks and District Gas Company, Ltd., has been registered, with a nominal capital of £25,000, as a public Company to carry on the business of gas manufacturers and suppliers as formerly undertaken by the Hurstpierpoint Gas Company, Ltd., at Hurstpierpoint, and by the Keymer and Ditchling Gas Company, Ltd., at Clayton, Keymer, and Ditchling.

Coleraine Gas Department.—At a recent meeting of the Coleraine Urban Council, which was the last under the old régime—for under the recent Charter of Incorporation the municipal body has been raised to a new and higher status—it was reported that 44,325,100 c.ft. of gas had been manufactured during 1928, an increase of 3,044,000 c.ft. over that for 1927. The output for 1918 was 21,250,000 c.ft.

Gas Cooks for a Nation.—Under the title of "Gas Cooks for a Nation," the British Commercial Gas Association have just published their 178th issue of "A Thousand-and-One Uses for Gas," which contains a description of the recent Cookery and Food Exhibition held at Olympia. Photographs are shown of the demonstration theatres and of exhibits on which were prepared the dishes made from various patented articles of food.

Gas Fatality at Hoxton.—Sixteen persons were gassed in their homes in Hoxton, London, during the morning of Jan. 13, one woman subsequently dying in hospital. It is stated that the escape of gas has been traced to a broken main running under the footpath of the road concerned. The cause of the break in the main, which was immediately repaired, is not known. It is assumed that the escaping gas filtered through the soft earth up through the floor boards of the houses. All the surrounding premises were temporarily vacated by order of the police.

New Valuation of Bradford Gas Department.—The Bradford City Gas Engineer and Manager (Mr. E. J. Sutcliffe) reported to his Committee on Jan. 11 that the assessment of the Bradford Gas Department properties has been raised from £32,343 to £42,959—an advance of £10,616—a figure which the Engineer considers excessive and unjustifiable. It was stated that on some of the Committee's premises the valuation had been reduced, but there was the net increase stated by the fact that on the gas mains and service pipes in Bradford alone there was an increase of £11,808. The Committee decided that the City Treasurer should be consulted with a view to an appeal.

Cheaper Gas for Middlesbrough.—Sir Joseph Calvert, Chairman of the Middlesbrough Gas and Electricity Committee, intimated at a meeting of the Town Council on Jan. 8 that there was a prospect of a cheaper supply of gas and electricity at the beginning of the next financial year. The position of both undertakings was very satisfactory. For the first time in the history of the gas undertaking they had topped the thousand million cubic feet mark of consumption. This was an increase of nearly double the business in a short number of years. The comparatively low price of gas was due to the extension of the undertaking, and it was hoped that the reduction might be brought about at the commencement of April, if the consumption were maintained.

Gas Mains under Concrete at Farnham.—The proposal to concrete part of East Street, Farnham, where the Farnham Gas and Electricity Company have a 12-in. trunk main, was the subject of a letter written by Mr. A. E. Saville, Secretary and Manager to the Gas and Electricity Company, and read at the meeting of the Urban Council on Jan. 8. Mr. Saville stated that in view of the proposed reconstruction of the road surface in East Street, his Directors had instructed him to call the attention of the Council to the serious risk of damage to life and property that would be entailed if the gas main was not accessible for attention in case of leakage or fracture. As a means of reducing the number of cross services, they were laying a new main under the footpath on the north side. There was, however, a 12-in. trunk main under the road which could not be diverted. This main had, at the outset, to be laid very shallow so as not to interfere with the Council's drainage system. It was added that the Council would, no doubt, realize that, if this main was covered by concrete or ferro-concrete, any leakage might take days or weeks to locate, during which period considerable damage might be caused in case of fire or explosion. The Clerk said he had sent a copy of the letter to the County Surveyor for his observations, as East Street was a main road. He had also asked Mr. Saville if he had any suggestions to make, but he had none. The position was that the contract for the reconstruction of the road had been sent to the contractors, and was expected back signed at any moment.

Gasworkers' Wages at Port Talbot.—Arising out of their recent Government audit, the members of the Port Talbot Corporation have been threatened with a surcharge unless they immediately reduce the wages of their gasworkers to a figure that conforms to the scale of the National Gas Council. In 1921, prior to the amalgamation of the two local administrative authorities—the Margam Urban District Council and the old Aberavon Borough Council—into the United Borough of Port Talbot, the gasworkers of the two areas threatened to strike unless an increase in their wages was granted; and, after considerable discussion, the joint authorities agreed to a special award conceding the men 1s. 8d. a shift *plus* 12½ p.ct., and double time for Sundays. As a result of this concession the two authorities ceased to be members of the National Gas Council, and the rate has remained operative until the end of December last. An application to the National Gas Council for an arbitration on the matter was refused until the Corporation re-joined the Council; and the Corporation have now given notice to the gasworkers in the Margam and Aberavon areas that their wages must be reduced forthwith to 1s. an hour *plus* 12½ p.ct., and time-and-a-half for Sundays. The Corporation have now applied once more for membership of the National Gas Council, who are being asked to arbitrate. Meanwhile the Government Auditor, who adjourned the completion of the audit until the men had been given notice of a reduction, has now notified the Corporation that he is satisfied with the action which they have taken in the matter.

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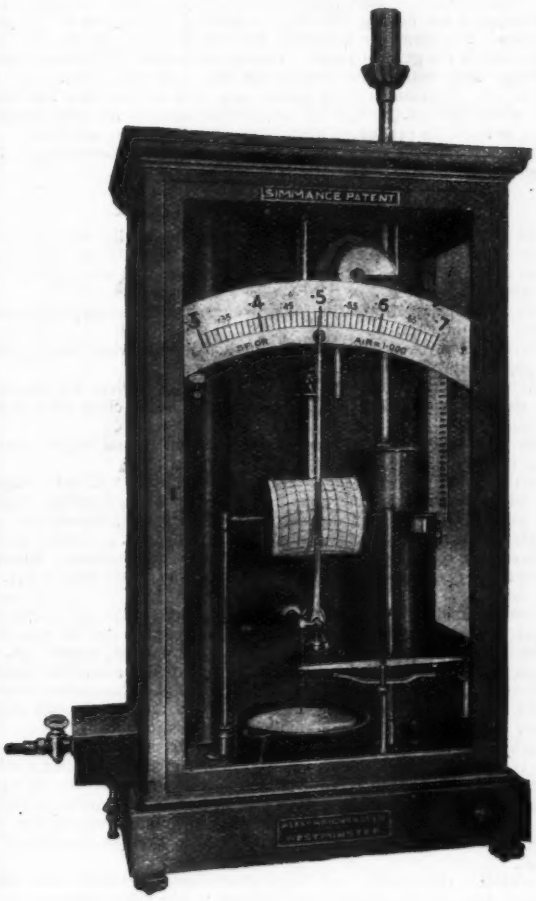

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From Our Own Correspondents.

NORTH-EAST COAST.

There has been considerably more activity in this market during the past week than for some time, and loading turns all round are well filled. Business, however, has been principally of a prompt order, covering a period of a week or two. There is not much evidence at present of inquiry for contract buying for further ahead, which is particularly needed, especially by second-class collieries. The market does not, therefore, place much faith in a continuance of the present activity, but naturally ideas are firming up with current demand being greatly improved.

Gas coals have been well taken, with Wear Specials firmly quoted at 15s. to 15s. 6d. f.o.b., and best qualities at 14s. 9d. to 14s. 10½d. Seconds have been in improved demand, good brands easily getting 13s. 6d., with others at 13s. to 13s. 3d.

Coking coals have been much more in request than for some time, and shippers are finding difficulty in making up cargoes of the good qualities. For some the quotation has advanced to 13s. 9d., but 13s. to 13s. 6d. is the general range. Bunker coals have experienced better trading. Best makes are firm at 14s. 6d., and seconds ask 13s. 3d. to 13s. 6d. Northumberland steams are well booked into February, and, while 14s. 3d. to 14s. 6d. is generally quoted for best screened sorts, as much as 14s. 9d. is said to have been paid for odd lots.

Gas coke remains very quiet, and stocks are accumulating. For shipment, 18s. to 18s. 6d. f.o.b. is quoted.

YORKSHIRE AND LANCASHIRE.

The demand for industrial fuels is rather spasmodic, with a firmer tendency for washed nuts. Dry double screened nuts are also in request, there being a material increase in the demand for bagging coal for domestic purposes.

Gas coals are moving easily under contract, with no surplus offering in the open market.

Furnace coke is inclined to improve in value, in view of the growing popularity of central heating.

There is no change in the export conditions. Prices for domestic coal show no variation; but the demand for better class coals is improving.

The following are the current Humber bunker and export prices, f.o.b. usual shipping ports:

South Yorkshire—Hards, Association, bunkers 19s. 9d., export 16s. 6d.; screened gas coal, export 16s. 6d.; washed trebles, export 16s. to 16s. 6d.; washed doubles, bunkers 17s. 9d., export 15s. 3d. to 15s. 9d.; washed singles, export 14s. 6d. to 14s. 9d.; washed smalls, bunkers 14s. 6d., export 11s. to 11s. 6d.; rough slack, bunkers 12s. 6d. to 13s., export 8s. 6d. to 9s.; smithy peas, export 17s. to 17s. 6d.

West Yorkshire—Hartley's (f.o.b. Goole), bunkers 17s. 3d. to 17s. 9d., export 15s. to 15s. 6d.; screened gas coal, export 15s. to 15s. 6d.; washed trebles, export 15s. 6d. to 16s.; washed doubles, export 14s. 6d. to 14s. 9d.; washed singles, export 13s. 6d. to 14s.; washed smalls, bunkers 13s. 6d. to 14s., export 10s. 6d. to 11s.; unwashed trebles, export 15s.; unwashed doubles, export 12s. to 12s. 6d.; rough slack, export 9s. to 9s. 6d.; coking smalls, export 8s. 6d. to 9s. 6d.

Derbyshire and Nottinghamshire—Top hards, bunkers 19s. 9d., export 16s. to 16s. 6d.; cobbles, export 15s. 6d. to 16s.; washed trebles, export 15s. 6d. to 16s.; washed doubles, export 14s. 6d. to 15s.; washed singles, export 14s. to 14s. 6d.; washed smalls, bunkers 14s. 6d., export 11s. to 11s. 6d.; unwashed doubles, export 12s. 6d. to 13s. 6d.; rough slack, bunkers 12s. 9d. to 13s. 3d., export 9s. to 9s. 6d.

Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, bunkers 17s. to 18s., export 13s. to 14s.; gas coke, export 21s. to 23s.; furnace coke, export 19s. to 19s. 6d.; washed steam (Goole, West Yorks.), bunkers 17s. 3d.; Hull (West Yorks.), bunkers 17s. 9d.; Hull (South Yorks.) bunkers 17s. 9d., export 14s. 6d. to 15s.

MIDLANDS.

The turn of the year has made no essential change in the situation. There has been some quickening of consumptive demand in the house coal trade, but suppliers have had little difficulty in keeping up with it. Occasional delays have occurred in fulfilling orders for the best qualities; but there has been no real shortage to stimulate prices. Values generally remain on the same basis as before Christmas.

On the industrial side the market remains featureless. Some orders have been given out where stocks had been allowed to run low; but contracting has not made much progress. The contention as to the appropriation of the rebate on fuel traffics to the blast-furnaces is being left to settle itself by the play of market conditions. The Minister of Transport has made it clear that he will not attempt to apportion the relief. It is apparent that nothing effectual can be done by such expedients as the consignor electing to pay carriage or holding the middleman as responsible for the repayment of the rebate to him. There is certainly a considerable body of moderate opinion which would acquiesce in an equal division of the rebate between colliery and blast-furnace. Pig iron has opened strong, not strong enough, however, to stand an increase of prices. All the same, the demand of consumers for concessions on account of the rebate appears to have been outlived.

The transport system has been working fairly well.

CONTRACTS OPEN.

Tar.

The Slough Gas and Coke Company invite tenders for surplus crude tar. [See advert. on p. 176.]

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Jan.* 14.

There is little of interest to report in the London tar products market.

Pitch continues quiet at about 37s. 6d. per ton.

Creosote is about 7d. per gallon.

Tar spirits are firm and steady. Pure benzole is about 1s. 9d. to 1s. 10d. per gallon; pure toluole, about 2s. 1d. per gallon; and 95/160 solvent naphtha, 1s. 5d. to 1s. 6d. per gallon.

Pyridine is quiet at about 4s. 3d. per gallon.

Tar Products in the Provinces.

Jan. 14.

There is little or no variation in markets for tar products generally.

Pitch is a little firmer, and business has been done on the basis of 36s. f.o.b.

Creosote oil is still quiet, and prices are unchanged.

Water-white products remain steady. There is a keen demand for delivery all over the present year; but manufacturers are generally refusing to sell except for near delivery.

Crude carbolic acid and cresylic are unchanged.

In naphthalene there is no business doing, but prices remain unaltered.

The average prices of gas-works products during the week were: Gas-works tar, 23s. to 28s. Pitch—East Coast, 35s. to 36s. f.o.b. West Coast—Manchester, 30s. to 30s. 6d.; Liverpool, 32s. to 33s.; Clyde, 32s. to 33s. Toluole, naked, North, 1s. 5d. to 1s. 6d. nominal. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 1½d. to 1s. 2d. Heavy naphtha, North, 1s. to 1s. 0½d. Creosote, in bulk, North, liquid, 4⅝d. to 4¾d.; salty, 4½d. to 4⅝d.; Scotland, 4½d. to 4⅝d. Heavy oils, in bulk, North, 8¼d. to 8½d. Carbolic acid, 60 p.ct., 1s. 10d. to 1s. 11d. prompt. Naphthalene, £13 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Benzole Prices.

The following are considered to be the market prices to-day:

	s. d.		s. d.	
Crude benzole	0 10	to	0 10½	per gallon at works
Motor ,,	1 4	,,	1 4½	,, ,, ,,
90 p.ct. ,,	1 7	,,	1 8	,, ,, ,,
Pure ,,	1 10	,,	1 11	,, ,, ,,

TRADE NOTES.

Weldless Chains, Ltd.

Weldless Chains, Ltd., of Coatbridge, have published a booklet dealing with their various manufactures in the way of steel chains, couplings, safety lifting appliances, &c. Their "Virex" positive lifting clamp, concerning which full details are given, is designed to lift anything from tin sheets to armour plates. With this apparatus the heavier the load, the firmer the grip.

Aldershot Stock Issue.—As will be seen from the announcement appearing in our advertisement pages, Messrs. A. & W. Richards are offering for sale by tender £110,000 4 p.ct. preference stock of the Aldershot Gas, Water, and District Lighting Company. The minimum price of issue is £70 per £100. Tenders must reach Messrs. A. & W. Richards by 11 o'clock on Wednesday, the 23rd inst.

Shop Heating Appliances.—The Newcastle-upon-Tyne and Gateshead Gas Company have recently issued a pamphlet dealing with various types of gas appliances for shop heating. It is emphasized how a warm and attractive shop aids business. Particulars and terms of suitable gas radiators are given; and mention is made of the super-burner which gives an illumination of 250 C.P. for a fraction of a halfpenny per hour, and will also add a degree of warmth without extra cost.

Some fifty employees of the Brighton and Hove General Gas Company were present on Jan. 12 at the funeral, in Brighton, of Mr. Henry William Gasston, District Inspector of the Company. Mr. Gasston, who died on Jan. 7, in his 57th year, had been in the Company's employ for a quarter-of-a-century.

At the inquest on Mrs. L. Jefferson, at Gosport, on Jan. 10, evidence showed that she had gone to bed leaving the gas in the room burning. The next morning her son, finding that the meter needed another coin, put one in, causing an escape in his mother's room, with fatal consequences. The Coroner questioned the safety of slot meters in such a connection, and returned a verdict of "Death from misadventure."

The employees of Messrs. George Bray & Co., Ltd., the well-known gas lighting engineers, of Leeds, who raised £100 last spring on behalf of the Leeds Maternity Hospital extension fund, have continued their efforts to such good effect that last week they presented a further £100 to the same institution. The Board of the Hospital have expressed high appreciation of a generosity which is a fine example to employees in other large Leeds works.

The Doncaster Corporation Gas Department are making experiments with a new type of gas lamp, which, it is said, will greatly improve street lighting. The ordinary burner and mantle are used, and a special refractory glass eliminates wastage of light, and directs the rays into the roadway.

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Jan. 11.	Rise or Fall on Week.	Transactions Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Aug. 30	5	5	Aldershot 5 p.c. max. C. .	72—77	..	75—77
412,992	,,	,,	4	4	Do. 4 p.c. Pref. . .	69—72	..	..
1,551,868	,,	Sept. 27	7	7½	Alliance & Dublin Ord. .	98—101	+2	..
374,000	,,	Jan. 10	4	4	Do. 4 p.c. Deb. . .	68—66*	..	..
523,654	,,	Aug. 30	7	7	Barnet Ord. 7 p.c. . . .	114—117	..	..
300,000	1	Oct. 11	1/7½	1/8½	Bombay, Ltd.	20/—22/-	..	21/—21/9
170,000	10	Aug. 30	8½	8½	Bournemouth 5 p.c. . . .	12½—13½	..	..
500,050	10	,,	7	7	Do. B 7 p.c. . . .	12½—13	..	..
375,000	10	,,	6	6	Do. Pref. 6 p.c. .	11—11½	..	..
50,000	Stk.	Jan. 10	3	3	Do. 3 p.c. Deb. .	55—58*	—1	..
163,025	,,	,,	4	4	Do. 4 p.c. Deb. .	74—77*	—1	..
357,900	,,	Aug. 30	7½	7½	Brighton & Hove 6 p.c. Con.	115—118	..	..
341,880	,,	,,	6½	6½	Do. 5 p.c. Con.	101—104	..	..
1,287,500	,,	July 26	5	5	Bristol 5 p.c. max. . . .	93—94a	+½	..
885,000	,,	Sept. 27	7	8	British Ord.	115—118	..	116—116½
100,000	,,	Dec. 20	7	7	Do. 7 p.c. Pref. . . .	115—120	..	118
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. .	78—76	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. .	92—96	..	..
100,000	10	Dec. 6	8	6	Cape Town, Ltd. . . .	7¾—8¼	..	..
100,000	10	Oct 25	4½	4½	Do. 4½ p.c. Pref. . .	6¾—7½	..	6¾—7⅛
150,000	Stk.	Dec. 20	4½	4½	Do. 4½ p.c. Deb. . .	71—76	..	..
626,860	,,	July 26	6	6	Cardiff Con. Ord. . . .	97—100	..	..
187,880	,,	Jan. 10	7½	7½	Do. 7½ p.c. Red. Deb. .	98—101*	—2	..
157,150	,,	Aug. 16	6½	5	Chester 5 p.c. Ord. . . .	89—94b	+1	..
79,185	1	Oct. 11	1/-	1/-	Colombo Ltd. Ord. . . .	36/—38/	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. . .	21-/—23/-	..	..
375,402	1	Oct. 11	1/9½	1/9½	Colonial Gas Assn. Ld. Ord.	24/—26/-	..	24/-
187,848	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	21/—23/-	..	..
2,073,280	Stk.	July 26	7	5	Commercial Ord. . . .	98—101	..	..
475,000	,,	Dec. 20	8	8	Do 8 p.c. Deb. .	56—59*	..	58⅞
600,000	,,	Sept. 27	11	11	Continental Union, Ltd. .	120—125	+8	115—124½
200,000	,,	,,	7	7	Do. 7 p.c. Pref. .	118 123	..	107
187,560	,,	Aug. 16	7	7	Croydon sliding scale . .	110—113	..	112—112½
403,100	,,	,,	5	5	Do. max. div. . . .	84—87	..	86½—87
492,270	,,	Aug. 16	10	7	Derby Con.	115—120e	..	..
55,000	,,	Dec. 20	4	4	Do. Deb.	70—72e	..	..
400,000	,,	Aug. 30	5	5	East Hull Ord. 5 p.c. . .	75—78	..	..
1,002,180	10	Sept. 13	†6	†4	European, Ltd.	11 12	+1½	10⅞—11½
14,703,480	Stk.	July 26	5/1/4	5½	Gas Light & Coke 4 p.c. Ord.	18/3—18/9f	+1½	18/1½—18/9
2,602,000	,,	,,	3½	3½	Do. 3½ p.c. max. . . .	64—66	+1	64—65
4,187,020	,,	,,	4	4	Do. 4 p.c. Con. Pref. .	78—81	..	79½—80½
5,602,620	,,	Dec. 20	3	3	Do. 3 p.c. Con. Deb. .	59—61	..	59½—60½
181,815	,,	,,	6	6	Do. 6 p.c. Br'tf'd Rd. Db.	102—105	..	..
1,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. .	98—100	..	100½
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb. .	..	..	..
82,500	,,	Aug. 30	6½	7	Hastings & St L. 5 p.c. Conv	95—100	..	..
268,740	,,	,,	5½	5½	Do. 5½ p.c. Conv.	75—80	..	..
70,000	10	Oct. 11	†10	†10	Hongkong & China, Ltd. .	13—14	..	..
178,200	Stk.	Aug. 30	5	5½	Hornsey Con. 3½ p.c. . .	88—91	..	..
1,976,000	,,	Nov. 8	10	10	Imperial Continental Gas.	245—255	+35	219½—257
228,180	,,	Aug. 16	8½	8½	Do. 8½ p.c. Red. Deb.	67—69	..	..
235,242	,,	Aug. 16	7	7½	Lea Bridge 5 p.c. Ord. . .	116—121	..	120
2,145,907	,,	Aug. 16	5½	5½	Liverpool 5 p.c. Ord. . .	90½—91b	..	..
600,000	,,	Sept 27	7	7	Do. 7 p.c. Red. Pref.	101—102b	..	..
168,786	,,	Aug. 16	8	9	Maidstone 5 p.c. Cap. . .	124—129	..	..
63,480	,,	Dec. 20	3	3	Do. 3 p.c. Deb. . .	54—57	..	..
75,000	5	Dec. 6	18	18	Malta & Mediterranean .	5¼—6	..	..
392,000	—	—	—	—	Metrop't'n (of Melbourne) 5½ p.c. Red. Deb. . . .	99—101	..	..
641,920	Stk.	Nov. 22	†7	†5	Montevideo, Ltd. . . .	95—97	..	..
2,081,815	,,	Aug. 16	5	5	Newcastle & Gateshead Con.	17/3—17/9df	+-/6	..
380,922	,,	,,	4	4	Do. 4 p.c. Pref. .	73¼—74¼d	+2	..
691,705	,,	Dec. 20	8½	8½	Do. 8½ p.c. Deb. .	68—69d	..	..
181,780	,,	Aug. 30	6/18/0	7/1/0	North Middlesex 6 p.c. Con.	102—107	..	..
300,000	,,	Nov. 22	7	9	Oriental, Ltd.	112—115	..	..
188,120	,,	Dec. 20	7½	8	Plym'th & Ston'house 5 p.c.	108—111	..	..
414,500	,,	Aug. 30	7½	7½	Portsm'th Con. Stk. 4p.c. Std.	109—112	..	110—112
336,782	,,	,,	5	5	Do. 5 p.c. max.	79—82	..	80—81
2,334,464	1	—	—	—	Primitiva Ord.	25/6—27/6	..	26/3—26/10½
244,500	100	Dec. 8	4	4	Do. 4 p.c. Red. Deb. . .	91—94	..	..
695,000	Stk.	July 26	4	4	Do. 4 p.c. Red. Deb. 1911	79—81	..	..
416,345	,,	Dec. 20	4	4	Do. 4 p.c. Cons. Deb. . .	78—80	..	79
150,000	10	Sept. 27	6	6	San Paulo 6 p.c. Pref. . .	8¾—8⅞	+¼	8½
1,736,968	Stk.	Aug. 30	—	—	Sheffield Cons.	104—106e	..	..
95,000	,,	July 12	—	—	Do. 4 p.c. Deb. . . .	75—77e	..	..
90,000	10	June 14	‡3	‡4	South African	4—6	..	..
6,609,895	Stk.	July 26	7½	5	South Met. Ord.	106½—108½	..	106½—108
500,000	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	110—113	..	..
1,895,445	,,	Jan. 10	3	3	Do. 3 p.c. Deb. . .	59—61*	..	60½—61
734,000	,,	Sept. 13	6½	6½	Do. 6½ p.c. Red. Db.	101—103	+1	..
91,500	,,	Aug. 16	8½	8½	South Shields Con. . . .	109—110d	..	..
1,248,795	,,	July 26	6½	6½	South Suburban Ord. 5 p.c.	109—112	+1	110—111
868,887	,,	Dec. 20	5	5	Do. 5 p.c. Deb.	97—100	..	99
647,740	,,	Aug. 30	5	5	South'mpton Ord. 5 p.c. max.	77—79	..	78—79
131,275	,,	Dec. 20	4	4	Do. 4 p.c. Deb.	72—75	+1	..
350,000	,,	Aug. 30	7	7	Swansea 7 p.c. Red. Pref. .	101—103	..	..
200,000	,,	Dec. 20	6½	6½	Do. 6½ p.c. Red. Deb.	99—101	..	..
130,000	,,	July 26	7½	8	Tottenham District A 5 p.c.	..	..	..
882,275	,,	,,	6¾	6¾	Do. B 3½ p.c.	101—104	..	102½
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	96—99	..	..
181,355	,,	Dec. 6	4	4	Do. 4 p.c. Deb.	75—78	..	..
289,094	,,	Aug. 30	6⅞	6¾	Uxbridge, Maidenhead, & Wycombe 5 p.c. . . .	93—98	..	..
98,330	,,	,,	5	5	Do. 5 p.c. pref. .	87—92	..	..
80,000	,,	July 12	8½	8½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c. .	130—135	..	..
356,626	,,	,,	7	7½	Do. B 3½ p.c.	113—118	..	..
422,585	,,	,,	5/19/0	6½	Do. C and New	99—104	..	..
552,000	,,	,,	6¾	6¾	Do. Wimbledon 5 p.c. .	107—112	..	..
98,000	,,	,,	7½	7½	Do. Epsom 5 p.c. . .	117—122	..	..
400,000	,,	,,	5	5	Do. 5 p.c. Pref . . .	88—91	..	92½
88,416	,,	Dec. 20	8	8	Do. 8 p.c. Deb. . . .	56—59	..	..
384,748	,,	,,	4	4	Do. 4 p.c. Deb. . . .	75—78	..	..
207,500	,,	,,	5	5	Do. 5 p.c. Deb. . . .	96—98	..	..

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle. e.—Sheffield. f.—The quotation is per £1 of Stock. * Ex. div. † Paid free of income-tax. ‡ Fog year.

PARAGRAPHS WITH A "NEWS" INTEREST.

Much valuable publicity for manufacturers is often obtained through the insertion of paragraphs sent in to the Editors of "Home" pages, &c., in the Public Press.

Provided these paragraphs hold a "news" interest, they are reasonably sure of acceptance; although they are recognized as manufacturers' publicity.

In just the same way, some displayed advertisements claim Public attention very quickly and accomplish their purpose easily, because of what may be called their "news" value.

Advertisements of the "New World" cooker afford a striking instance, because they are able to include an item of absorbing interest to every housewife today, in the statement that whole-dinners—joint, vegetables, and sweets—can be perfectly cooked in a given time, entirely independent of human control or watching. Such a claim can never fail in its appeal to the busy modern woman.

Experiences at cookery demonstrations, &c., all over the country, bear out the significance of this feature of the "New World" cooker.

Moreover, the fact that dozens of such simultaneous whole-dinner recipes are available is testimony to the thorough reliability of the "Regulo" in every respect.

(*Advt. of Radiation Ltd.*)

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Town Hall, Stockport, Jan. 3, 1929.

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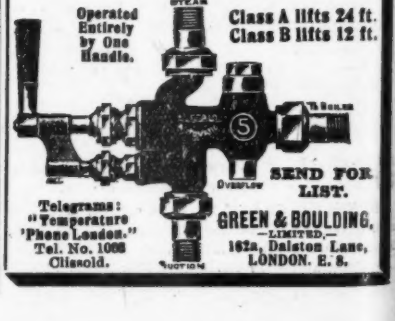

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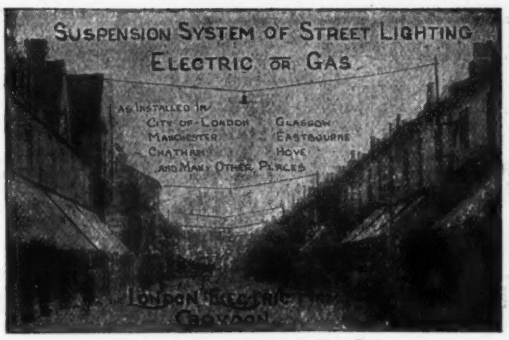

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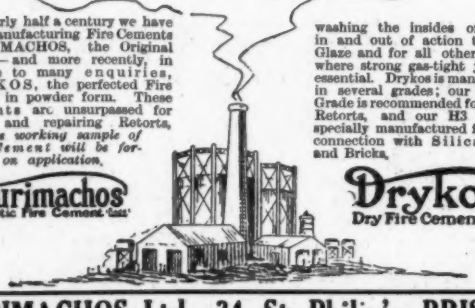

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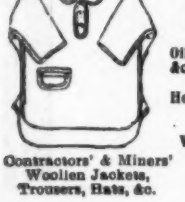

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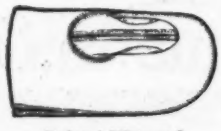

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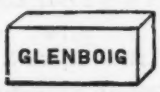
TRADE 

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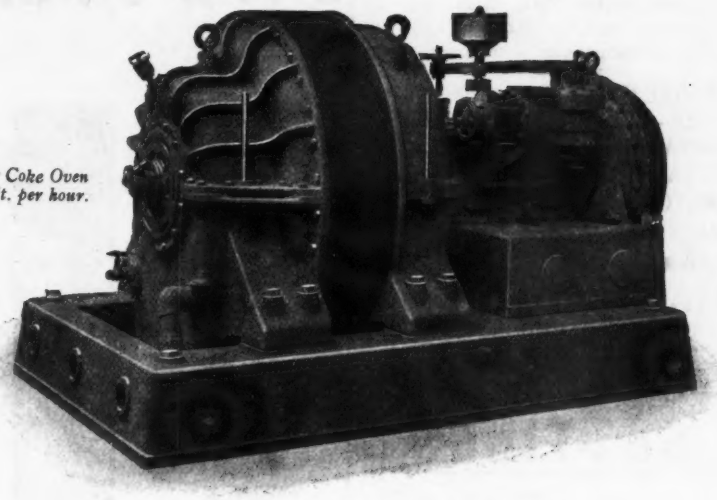

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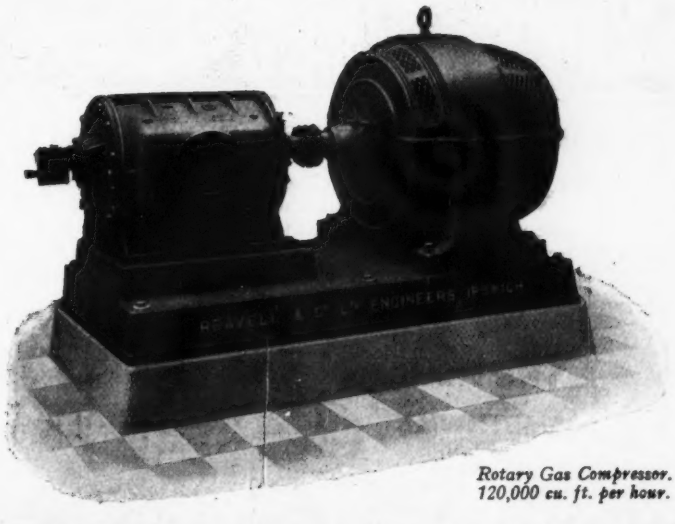

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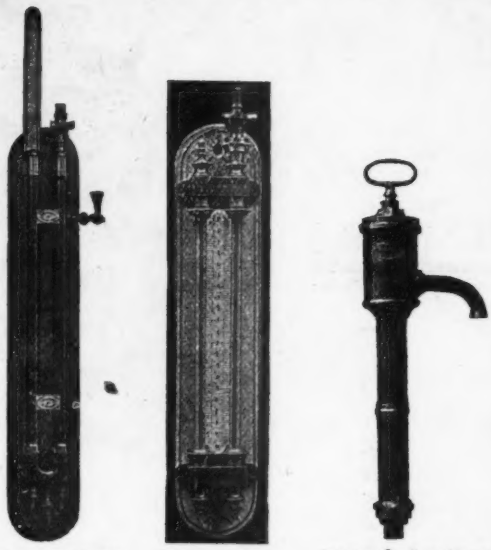

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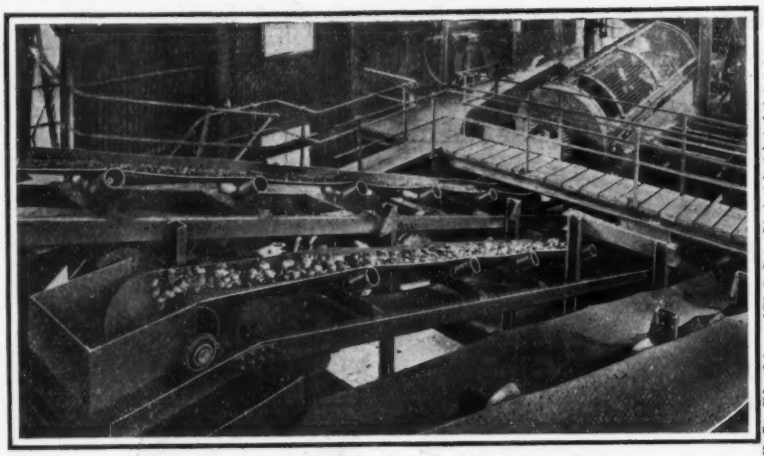

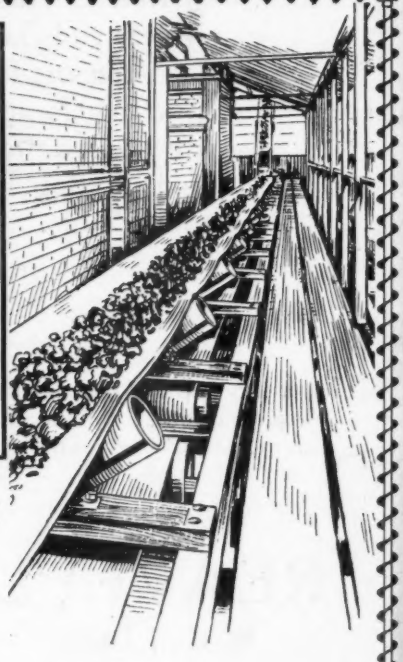

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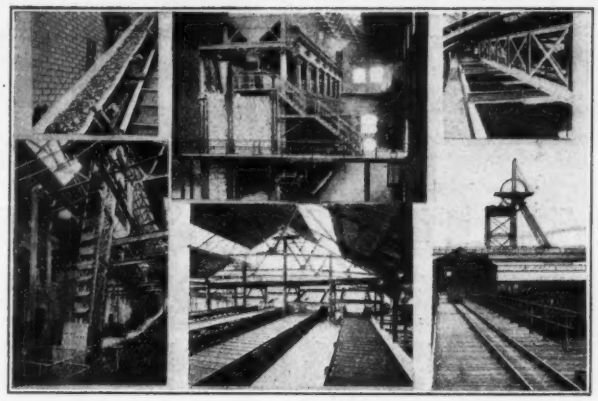

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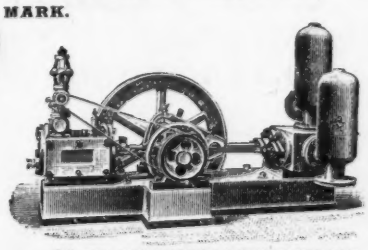

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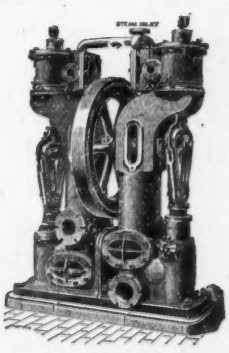

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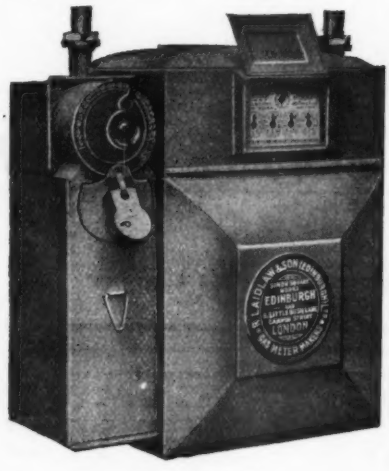

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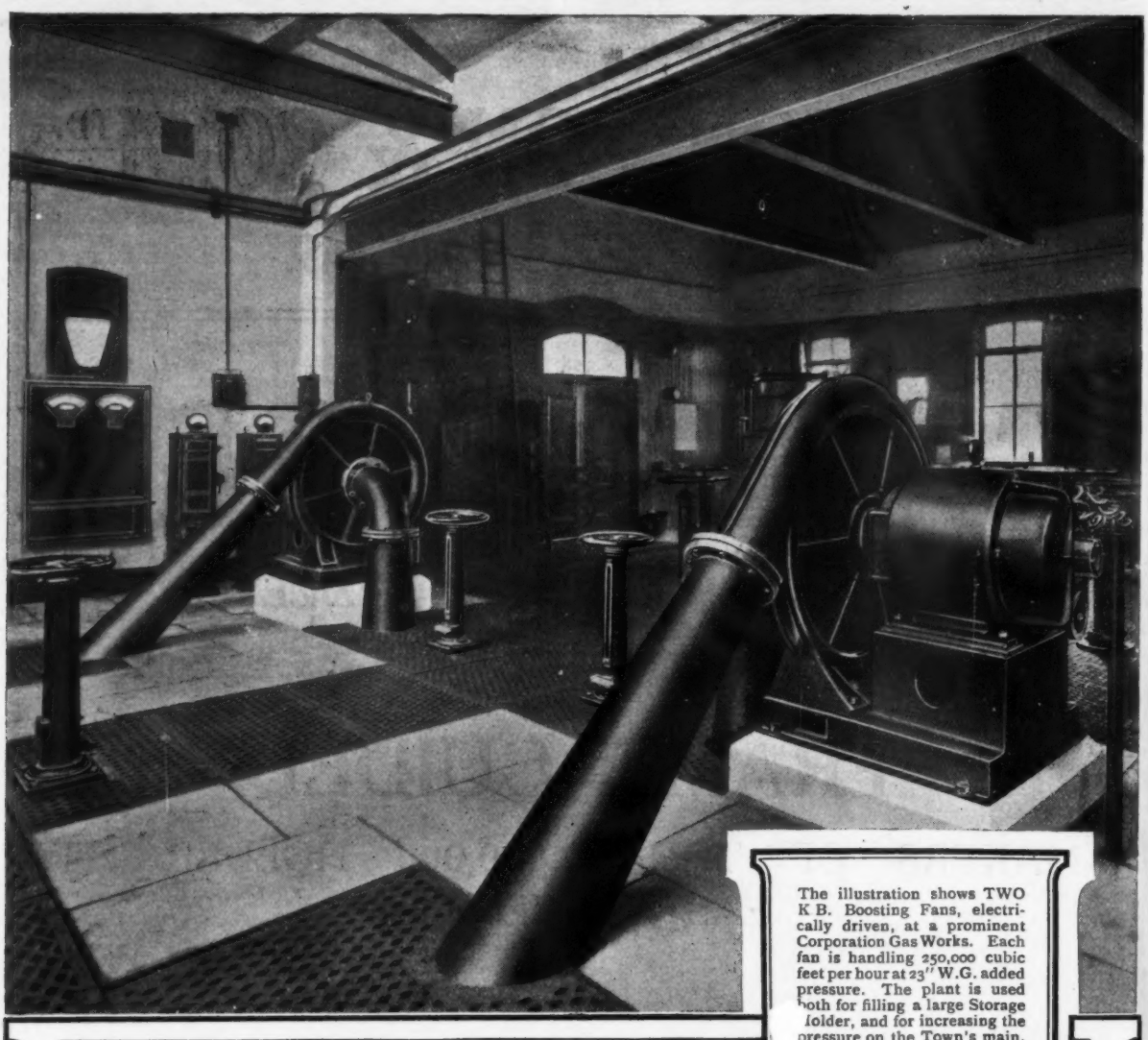

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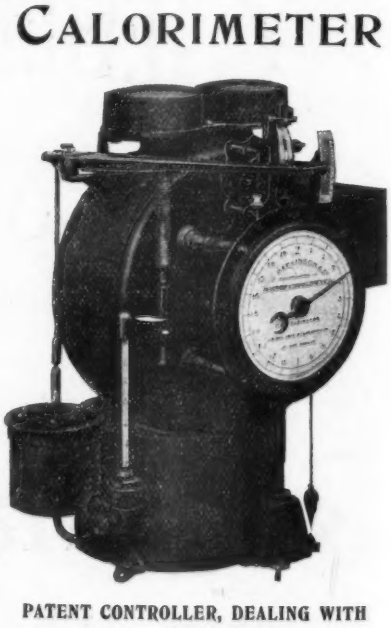

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